

THE IRON AGE

A Review of the Hardware, Iron, Machinery and *Smithsonian Institution* Trades.

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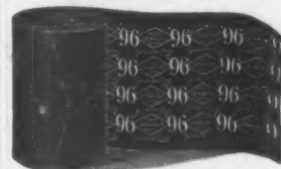
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SEE
PAGE 11.



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THE IRON AGE

THURSDAY, MARCH 26, 1903.

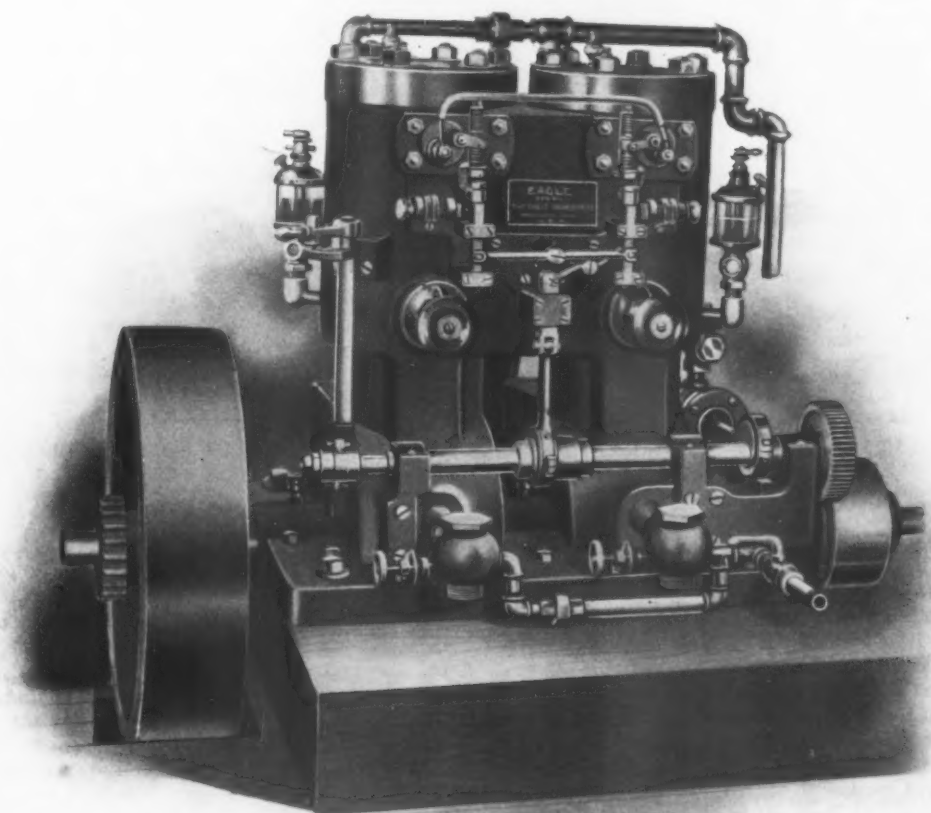
Business Methods in Management of Public Works.

William C. Redfield, Commissioner of Public Works, Borough of Brooklyn, and for many years a prominent official of J. H. Williams & Co., Brooklyn, manufacturers of drop forgings, made an admirable address before the Manufacturers' Association of that city, March 16, on the "Effectiveness of Business Methods in the Management of Public Works." There was no trace of any political flavor from beginning to finish, the purpose of the discourse being solely to contrast such business methods as a capable individual manufacturer would seek to introduce and maintain in his plant, to get the best service for the least expenditure, as opposed to the tenets

tracts for \$900,000 worth of paving prepared by the engineering staff in 17 hours after the appropriation was made, to economize valuable time, thus showing what could be accomplished by employees with their hearts in the work. The address brought out clearly what is possible with a businesslike organization of the departments working under methods that obtain in successful private enterprise, with such modifications as adapt them to the changed conditions.

The Eagle Double Cylinder Marine Gasoline Engine,

In the 10 horse-power double cylinder gasoline engine built by the Eagle Bicycle Mfg. Company of Torrington,



THE EAGLE DOUBLE CYLINDER MARINE GASOLINE ENGINE.

of the average politician in the different parties, many of whom sincerely believe it is proper for the municipality to employ all the help that appropriations can be obtained for, regardless of whether the help is necessary or any service is performed.

The address related to such public work as street paving, sewer building and cleaning, building of bridges spanning unnavigable streams, care of public buildings, sewage disposal plants, &c., laying of sidewalks, removal of encumbrances and kindred topics. To enhance the interest a great many stereopticon views graphically reinforcing the speaker's statements, not only pictured streets before and after paving, but threw on the screen comparative tables in compact form showing both in figures and by diagrams the ratio of progress under this administration, contrasted with work previously done. The results showed a larger volume at a lesser percentage of cost. One exhibit was of an advertisement of con-

Conn., each cylinder is of the two-cycle type, in which there is an explosion of the gas mixture at every revolution of the engine or downward stroke of the piston. This construction imparts steadiness of motion to the boat, insures a compact design, and there is an entire absence of the secondary shaft, with the valves, springs, reducing gears, &c., present in engines of the four-cycle type. There are no valves in the usual meaning of that term, the piston itself serving to open and close the gas passages formed in the cylinder.

One of the most unique features of the engine is the method of speed control, which is at once simple and efficient. The mechanism by which this is accomplished is placed in front of the engine, as shown in Fig. 1, and is entirely exposed, so that inspection is easy. Regulation is obtained by changing the time of the spark ignition and by regulating, by means of a throttle valve, the amount of gas mixture admitted into the explosion

chamber. There is an explosion in such cylinder at every revolution, as stated, but the time of the explosion, in relation to the movement of the piston, and its force, as governed by the quantity of gas mixture admitted by the throttle, can be instantly regulated. This provides for the nice speed adjustment of the engine.

Extending across the front of the engine is a shaft operated by gearing from the main shaft. At the center of this shaft is an eccentric operating a rod, whose upper end is attached to one end of a rocking lever. The other end of this lever is secured to a second lever, disposed horizontally and pivoted at its center to the case. It will now be understood that the movement of the eccentric imparts a rocking or seesaw motion to the upper or second lever. To each end of this lever is fastened a rod actuating the ignition device, one, of course, being provided for each cylinder. This construction provides for alternate sparking, but at the same intervals of time, in

Squandering Coal.

BY EGBERT P. WATSON.

Americans are said to be most wasteful of their natural resources, and this would seem to be true of coal, at least. During the last winter, even when it was very costly and hard to get at any price, it was wasted in manufacturing and domestic uses to an extraordinary degree. It was not uncommon to see coal that had never been touched by fire, green coal, so to call it, thrown into ash barrels as if it had been refuse. In plain sight on top of the rubbish good hard coal could be found all through the street, until some scavenger came along and transferred it to his bag. Similarly among the ashes carried out from factories and hotels plenty of good fuel could be found in a very short walk. If not always green coal it was in a majority of cases half burned.

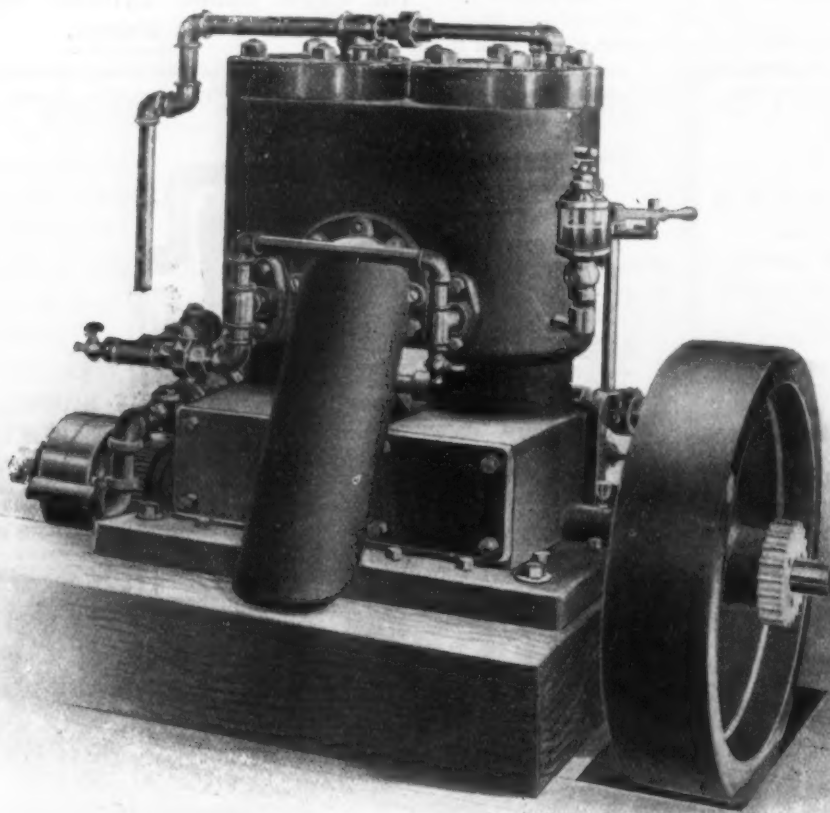


Fig. 2.—Rear View.

THE EAGLE DOUBLE CYLINDER MARINE GASOLINE ENGINE.

each cylinder. It is necessary, however, to change the time of ignition as regards the movement of the pistons. At the right hand end of the eccentric shaft is a vertical shaft provided with a handle at its top by which it may be turned. The construction is such that by turning this handle the time of the throw of the eccentric and consequently the time of the ignition can be regulated according to the speed desired. Ignition may be made to take place just before or just after complete compression or at any intermediate stage.

The bituminous coal miners and operators, who have been in conference at Altoona, Pa., agreed on March 20 to adopt the following scale, to go into effect on April 1 for one year: 1. The pick mining rate shall be increased 10 per cent. 2. That the price of machine mining, both loading and cutting, shall be advanced 12 per cent. 3. That eight hours of actual work at place of work shall constitute a day's work for all labor inside of the mines, except pump men and monthly men, who are to continue on present conditions, with 10 per cent. advance, at present wages now paid.

through want of experience and knowledge how to use it. It seemed as though fires had been started, run for a short time, and then incontinently dumped out of the furnace and thrown away. Even now, when coal is much lower than it was six months ago, the same willful waste is manifest. Burning coal economically requires a person with a conscience, most who undertake it having none at all; the main object being to keep the fuel red hot with the direct dampers wide open. These last should be always closed, except when a new fire is started, or fresh fuel put on, and then for a few minutes only, or not at all, except when exigencies require heat as soon as possible, as in the case of a steam boiler furnace. Not only is heat allowed to go up the chimney as rapidly as it can be made to do so, but the fuel is crammed into the fire box until it falls out when the doors are opened. No attention is paid to cleaning the fire and removing clinders, which obstruct the grates and prevent the fuel from getting oxygen as is needed for combustion; the only thing that burns, in the view of inexperienced persons, being the coal itself, and it is left to do that as best it may.

To burn coal properly so as to get the greatest amount of heat it is capable of giving out is such a simple thing that it is readily acquired by wholly uneducated persons who know nothing whatever of carbonic acid, monoxide, or constituent gases of combustion, but depend for efficiency upon the color and the "feel," if such a term can be used, of the heat radiated from the boiler. A skilled fireman will get more steam with less consumption of coal than a man who has theories of combustion committed to memory in abundance, for the reason that the practical manipulation of the coal to produce steam is as necessary as an ability to call gases by their proper names.

The chief difficulty in the way of higher economy in the use of fuel, either in the factory or the household, is to get the man who pays the bills interested in saving it. It is a curious fact that it is very hard to do this. Growl he may and will at the price demanded, once the coal is dumped on his premises he takes no further heed of it, and whether it is burned, stolen, trodden under foot, scattered all over the premises by careless handling or exposed to the winds of heaven, it is of no concern to him. This aspect of the subject is well known to practical engineers, and those who are wise in their day and generation know how futile it is to try to get any economical device adopted upon the plea that it will save fuel. I was present not long ago at an interview between the owner of a large factory and an agent for an engine which had a high reputation for economy. The engine in the factory was an old fashioned slide valve engine, which had outlived its usefulness but was still grinding away as it had been for 25 years last past. The proposition made the owner was to install the new engine alongside the old one, make all the connections to the boiler and shafting and run it on trial for 90 days. If at the end of that time the present owner of the factory said it was not satisfactory the new engine would be taken away and no questions asked or bills presented. All the owner was required to do was to pay for the fuel while he was using the engine. The deal was not made, and it is safe to say that the old engine is still at work. A large publishing house in this city had an old fashioned engine to run its plant, and an old fashioned engineer to stay by it while it ran itself. This engine used 6 tons of coal weekly to run the machinery, an extravagant amount for the power it delivered, but no one complained of the coal bills. In the fullness of time the old engineer was discharged (not for burning too much coal, however) and a new one hired. This man, after two days' firing the boiler, came to the conclusion that "something was rotten in Denmark," and began to investigate. There was a cut off valve on the back of the main valve and in manipulating this he found that it made no difference where the valve was set the engine used just as much steam. Then he looked inside the steam chest and found that there were no cut off valves in it. Just at this juncture the old engineer came in to see how the new man was getting on, and turning to him the new man asked him where the cut off valves were? "You mean them blocks that was in there? I took 'em out; they stopped up the ports so the steam couldn't get in; they're in the bottom of the closet somewhere, I guess." When this worthy had departed the engineer hunted up the "blocks," and that night restored them to their proper place. Immediately the steam consumption was greatly reduced and the engineer expected that the gain in economy would be noticed. To his chagrin nothing was said about it, so after a few weeks he called the superintendent's attention to the subject, adding that there were other repairs needed which would result in still higher efficiency. The superintendent did not seem to care whether 6 tons of coal or 3 were used per week, but wanted to know what the overhauling would cost. When he was told that \$250 would cover it he immediately replied that the other engineer never asked for any repairs, adding that the new man must have been very careless to let the engine get into such a condition in the short time he had been there.

This is a true account of an actual occurrence, and it has been narrated as corroborative evidence of the indifference of some persons in charge of steam machinery and their recklessness in squandering coal. There is no

doubt but that there are many similar instances. Aside from gross neglect, however, there are cases where coal is wasted by using the wrong sizes. For many years a certain firm had been using the highest priced coal in the market, when but a few doors off another firm had been using the cheapest. As in the case mentioned previously, a new engineer, knowing that his employer's interest was also his interest, asked to have pea coal supplied in lieu of stove size. The superintendent "smiled superior" at this suggestion and said that it was of no use; they had tried it before and it wouldn't make any steam. "clogged all up on the grates." The new engineer asserted that it would burn all right and said there was no sense in paying \$2 a ton extra for coal when the lowest priced would answer even better. "You shove in 5 tons of it and just watch me burn it" he said. It was done, and, as experienced men know, the pea coal gave every satisfaction. It did clinker to some extent, but this was no bar to its use, the clinker being easily sliced free from the grate and lifted bodily out as occasion required.

The rapidity with which it ignited and was readily maintained alive was a great point in its favor; it not only made steam quickly and was cheaper in first cost but less of it was used. There was nothing but fine cinder in the ash pit, where previously, with the stove coal, there had been quantities of incombustible, palpable stone with which the coal had been loaded. The only change required was a new set of grate bars to suit the size of coal burned, the natural draft being ample. I have myself used pea coal in both ranges and house heaters, even with grates, $\frac{1}{2}$ -inch bar and $\frac{1}{2}$ -inch air space, where I formerly burned stove coal, resulting in far greater economy with no disadvantages of any kind. Pea coal suits slow combustion as well as quick combustion, and fires can be left to smoulder for hours until they are black on top and come to life again immediately so soon as doors are closed and dampers opened. If there are persons who have difficulty in using pea coal it is not by reason of the fuel itself, but through some other conditions which are unfavorable to its use. One of these is poor draft, either through dirty chimneys or possibly surrounding buildings recently erected, which create a down draft by baffling currents. On some steamers out of New York, a number in fact, pea coal is used in lieu of steamboat size, so called, but they employ forced draft; this is manifestly impossible in household service, but it could be used in factories if needed, where the natural draft is insufficient. "Willful waste makes woeful want," says the adage, and it applies especially to the squandering of one of the chief items of cost in maintenance. A certain quantity of fuel represents a certain number of dollars, and it is literally the fact that when it is shoveled into a furnace the result is the same to the pocket as if absolute cash was used. A man who has a small hole in his pocket which is likely to leak money hastens to repair it without delay, but when he burns coal, the equivalent of money or money's worth, he takes no thought of its cost, or whether it is wasted or not.

Another Hudson River tunnel is projected. The incorporation is announced from Albany, N. Y., under date of March 20, of the Hudson & Manhattan Railroad Company of New York City, with a capital of \$3,000,000, to construct a tunnel approximately 1 mile long, from Broadway through Cortlandt street, underground in New York City, and under the Hudson River to the boundary line of New Jersey, there to connect with a railroad of a New Jersey corporation. The directors are George P. Bester of Bloomfield, N. J.; Howard Slade and William H. Siegel of New York, Clinton Graham of Flushing, Robert Maroney, Charles H. Aron, James Davidson and A. F. Richter of Brooklyn, and A. B. Proctor, Jr., of Boonton, N. J.

The Mississippi River has been swollen by heavy rains beyond anything previously experienced. Levees have been broken at various points and great damage has ensued to all classes of property, railroads being among the heavy sufferers. The river at New Orleans has reached a higher stage than during the great flood of 1897.

The Anthracite Commission.

The report on the awards of the Anthracite Coal Strike Commission is a lengthy document, which necessarily deals in detail and exhaustively with the special conditions relating to the anthracite mining industry, and as such does not possess a direct interest for those engaged in the iron, metal and allied trades. The Commission, however, discusses some subjects in a manner which will be studied with interest by all who are confronted with labor questions at the present time. One burning question was that of the recognition of the union. This demand by the miners was refused by the Commission, on the ground that it was expressly stipulated that Mr. Mitchell appeared before the Commission as the representative of the anthracite coal mine workers and not in his official capacity as president of the United Mine Workers of America. "Nor does the Commission consider that the question of the recognition of the United Mine Workers of America is within the scope of the jurisdiction conferred upon it by the submission." The report continues:

In the days when the employer had but few employees, personal acquaintance and direct contact of the employer and the employee resulted in mutual knowledge of the surrounding conditions and the desires of each. The development of the employers into large corporations has rendered such personal contact and acquaintance between the responsible employer and the individual employee no longer possible in the old sense. The tendency toward peace and good fellowship which grows out of personal acquaintance or direct contact should not, however, be lost through this evolution to greater combinations. There seems to be no medium through which to preserve it, so natural and efficient as that of an organization of employees governed by rules which represent the will of a properly constituted majority of its members, and officered by members selected for that purpose, and in whom authority to administer the rules and affairs of the union and its members is vested.

The men employed in a certain line of work or branch of industry have similar feelings, aspirations and convictions, the natural outgrowth of their common work and common trend or application of mind. The union, representing their community of interests, is the logical result of their community of thought. It encourages calm and intelligent consideration of matters of common interest. In the absence of a union, the extremist gets a ready hearing for incendiary appeals to prejudice or passion, when a grievance, real or fancied, of a general nature, presents itself for consideration.

The claim of the worker that he has the same right to join with his fellows in forming an organization, through which to be represented, that the stockholder of the corporation has to join others in forming the corporation, and to be represented by its directors and other officers, seems to be thoroughly well founded, not only in ethics, but under economic considerations. Some employers say to their employees: "We do not object to your joining the union, but we will not recognize your union nor deal with it as representing you." If the union is to be rendered impotent, and its usefulness is to be nullified by refusing to permit it to perform the functions for which it is created, and for which alone it exists, permission to join it may well be considered as a privilege of doubtful value.

Trades unionism is rapidly becoming a matter of business, and that employer who fails to give the same careful attention to the question of his relation to his labor or his employees which he gives to the other factors which enter into the conduct of his business makes a mistake, which sooner or later he will be obliged to correct. In this, as in other things, it is much better to start right than to make mistakes in starting, which necessitate returning to correct them. Experience shows that the more full the recognition given to a trades union the more businesslike and responsible it becomes. Through dealing with business men in business matters its more intelligent, conservative and responsible members come to the front and gain general control and direction of its affairs. If the energy of

the employer is directed to discouragement and repression of the union, he need not be surprised if the more radically inclined members are the ones most frequently heard.

The Commission agrees that a plan, under which all questions of difference between the employer and his employees shall first be considered in conference between the employer or his official representative and a committee, chosen by his employees from their own ranks, is most likely to produce satisfactory results and harmonious relations, and at such conference the employees should have the right to call to their assistance such representatives or agents as they may choose, and to have them recognized as such.

In order to be entitled to such recognition the labor organization or union must give the same recognition to the rights of the employer and of others which it demands for itself and for its members. The worker has the right to quit or to strike in conjunction with his fellows, when by so doing he does not violate a contract made by or for him. He has neither right nor license to destroy or to damage the property of the employer; neither has he any right or license to intimidate or to use violence against the man who chooses to exercise his right to work, nor to interfere with those who do not feel that the union offers the best method for adjusting grievances.

The Rights of the Nonunion Man.

The union must not undertake to assume, or to interfere with, the management of the business of the employer. It should strive to make membership in it so valuable as to attract all who are eligible, but in its efforts to build itself up it must not lose sight of the fact that those who may think differently have certain rights guaranteed them by our free Government. However irritating it may be to see a man enjoy benefits to the securing of which he refuses to contribute, either morally, or physically, or financially, the fact that he has a right to dispose of his personal services as he chooses cannot be ignored. The nonunion man assumes the whole responsibility which results from his being such, but his right and privilege of being a nonunion man are sanctioned in law and morals. The rights and privileges of nonunion men are as sacred to them as the rights and privileges of unionists. The contention that a majority of the employees in an industry, by voluntarily associating themselves in a union, acquire authority over those who do not so associate themselves is untenable.

Those who voluntarily associate themselves believe that in their efforts to improve conditions they are working as much in the interest of the unorganized as in their own, and out of this grows the contention that when a nonunion man works during a strike he violates the rights and privileges of those associated in efforts to better the general condition and in aspirations to a higher standard of living. The nonunion man who does not believe that the union can accomplish these things insists with equal sincerity that the union destroys his efforts to secure a better standard of living and interferes with his aspirations for improvement. The fallacy of such argument lies in the use of the analogy of State government, under which the minority acquiesces in the rule of the majority; but government is the result of organic law, within the scope of which no other government can assume authority to control the minority. In all acts of government the minority takes part, and when it is defeated the government becomes the agency of all, not simply of the majority.

The Union Subordinate to the Laws of the Land.

It should be remembered that the trade union is a voluntary social organization, and, like any other organization, is subordinate to the laws of the land and cannot make rules or regulations in contravention thereof. Yet it at times seeks to set itself up as a separate and distinct governing agency, and to control those who have refused to join its ranks and to consent to its government, and to deny to them the personal liberties which are guaranteed to every citizen by the constitution and laws of the land. The analogy, therefore, is unsound and does not apply. Abraham Lincoln said:

"No man is good enough to govern another man without that other's consent." This is as true in trade unions as elsewhere, and not until those which fail to recognize this truth abandon their attitude toward nonunion men, to follow the suggestion made above—that is, to make their work and their membership so valuable and attractive that all who are eligible to membership will come under their rule—will they secure that firm and constant sympathy of the public which their general purposes seem to demand.

We believe it is unwise and impolitic to permit boys of immature age and judgment to participate in deciding the policy and actions of a labor union. We think that no one should have such voice in the affairs of a union until he has reached his legal majority. Those affairs are momentous and are of growing importance. They should be directed by men who have a realizing sense of the responsibilities of life, both as to family, as to associates and as to society. This does not mean, of course, that minors should not belong to the union, but they should not act as, nor vote for, delegates to conventions which consider or determine strikes.

Objectionable Features of Miners' Union.

The present constitution of the United Mine Workers of America does not present the most inviting inducements to the operators to enter into contractual relations with it. Minors are represented in conventions called for the consideration of strikes; while boys do not go as delegates, only one case having been noted, they send delegates to such conventions; and as the boys in the union in the anthracite region constitute about 20 per cent. of the membership, it is easily seen that their representatives, who may be obliged to act on instructions, may have the balance of power, and thus carry a vote for a strike when the more conservative and experienced members might be opposed to it.

Under the recently amended constitution of the United Mine Workers of America, strikes must originate with the locals or districts; but before final action is taken by any district upon questions that directly or indirectly affect the interests of the mine workers of another district, or that require a strike to determine such questions, the president and secretary of the aggrieved district must jointly prepare, sign and forward to the national president a written statement setting forth the grievance complained of, the action contemplated by the district and the reasons therefor; and the national president must, within five days after the receipt of such statement, either approve or disapprove of the action contemplated by the aggrieved district, such approval or disapproval to be made in writing and a copy forwarded to the secretary of the complaining district. If the national president approve, the district is free to act; but should he disapprove the contemplated strike the district may appeal to the national Executive Board, which must be convened to consider such appeal within five days after its receipt. Until the national president has approved or the national Executive Board has sustained the appeal, no district is free to enter upon a strike, unless it be general or national, ordered by a national convention.

These provisions give the districts in the anthracite region quite independent powers relative to the initiation of a strike, and their powers are in a measure safeguarded by the necessity of first securing the approval of the national president, or, in case of his disapproval, of the national Executive Board. The difficulty does not lie so much in the method now pursued as in the fact that a strike may be undertaken by a majority vote of the members of a district convention called for the purpose of considering the strike. This is considered a weakness in the present method. Instead of a majority vote there should be at least a two-thirds vote of all the delegates in the convention considering the question of a strike. The vote should be by ballot, and not by voice or show of hands. An amendment to the constitution, making such provisions as those just indicated, and creating a separate anthracite department, so far as strikes are concerned, would remove some of the serious objections that have been urged by the operators.

An independent and autonomous organization of the anthracite mine workers of Pennsylvania, however affiliated, in which the objectionable features above alluded to should be absent, would deserve the recommendation of this Commission, and were it within the scope of its jurisdiction, the said fourth demand of the statement of claim, for collective bargaining and a trade agreement, might then be reasonably granted.

From another part of the report of the Commission we take the following, which bears on matters over which the managers of other industries are deeply stirred up:

Disorder and Lawlessness.

Although some reflections on the general subject have been made, no discussion of the conditions prevailing in the anthracite region during the continuance of the late strike would be adequate that did not fully deal with the disorder and lawlessness which existed to some extent over the whole region and throughout the whole period. It is admitted that this disorder and lawlessness was incident to the strike. Its history is stained with a record of riot and bloodshed, culminating in three murders, unprovoked save by the fact that two of the victims were asserting their right to work, and another, as an officer of the law, was performing his duty, in attempting to preserve the peace. Men who chose to be employed, or who remained at work, were assailed and threatened, and they and their families terrorized and intimidated. In several instances the houses of such workmen were dynamited, or otherwise assaulted, and the lives of unoffending women and children put in jeopardy. The armed guards, employed to protect the collieries and the men who worked them, appear not to have been an unnecessary precaution, and the Governor of the State was, as the evidence before the Commission shows, justified in calling out the citizen soldiery of the Commonwealth to preserve its peace and vindicate its laws.

The resentment expressed by many persons connected with the strike at the presence of the armed guards and militia of the State does not argue well for the peaceable character or purposes of such persons. No peaceable or law abiding citizen has reason to fear or resent the presence of either.

It is true that exaggerated accounts of the disturbances were published, and there was testimony from reputable witnesses, tending to minimize them, and vouching for the good order of the communities in which such witnesses lived; but these were mainly in the localities where the operators made no attempt to work the collieries. It is also true, and justice requires the statement, that the leaders of the organization which began and conducted the strike, and notably its president, condemned all violence, and exhorted their followers to sobriety and moderation. It would seem, however, that the subordinate local organizations and their leaders were not so amenable to such counsels as to prevent the regrettable occurrences to which reference has been made.

In making this arraignment, we are not unmindful of what appears to be the fact, that the mine workers of the anthracite region are, in the main, well disposed and good citizens of the Commonwealth of Pennsylvania, and that it is in the power of a minority of the less responsible men and boys, together with the idle and vicious, unless properly restrained, to destroy the peace and good order of any community. Absence of protest and of active resistance on the part of the better element means encouragement and license to the class above described. It has been declared by some persons that this state of things is no more than was to be expected in communities where such large numbers of men and boys were idle for so long a time. If this be so, and it is not necessary for our present purpose to traverse the truth of this statement, it affects seriously the responsibility of those leaders of a labor movement who are, in the main, responsible for the inauguration and conduct of a strike.

There can be no doubt that without threats, intimidation and violence toward those who would otherwise be willing to remain at work, or take the places of those

who had ceased to work, the coercion of employers, which a strike always contemplates, would be less potent in compelling acquiescence in its demands. This is the danger point of the whole matter. The law, which governs all citizens of a free country alike, can make no exceptions. The beneficence of labor unions is acknowledged. Their development, as we view it, has been one of real, though of slow and intermittent, progress to the betterment of labor conditions and to improvement in the relations between employer and employed. All combinations of men, however, to achieve a common purpose have potencies for evil. Such combinations are more than mere aggregations of the rights and powers of the individuals composing them. They become new and powerful entities, and factors for good or ill, according to the wisdom or unwisdom with which they are managed and controlled. The strike ordered by a trade union, which compasses no more than the enforcement of demands previously made, for the supposed benefit of its members, by the cessation from work in the event that those demands are not complied with, transgresses no law of a free society, and, whether wise or unwise in inception and purpose, is an exercise of no more than the legal rights that belong collectively or individually to its members.

It is true that the stress thus placed upon employers may constitute a kind of coercion, resulting, in some cases, in an enforced compliance with the demands of the association or union. Such coercion, however, is not illegal and does not come within the condemnation of the law. It is the indirect consequence of the legal exercise of the right to work, or to cease to work, belonging to all men.

But a strike set on foot with the view to the accomplishment of its purpose by intimidation or violence, exercised against those who choose to remain at work, violates the law from the beginning. Where, however, the strike itself is separable from the illegal violence and intimidation, which in many cases accompany it, the legal liability for such violence and intimidation rests alone upon the individuals who commit the act and those who aid, encourage and abet them. Though no illegality of purpose is imputable to those inaugurating a strike, its existence, if it involve large numbers of men in a single community, tends, of itself, to produce disorder and lawlessness.

As has been said, the idle and vicious, who are in no way connected with the purpose or object of the strike, often unite with the less orderly of the strikers themselves in creating the deplorable scenes of violence and terror which have all too often characterized the otherwise laudable efforts of organized labor to improve its conditions. Surely this tendency to disorder and violation of law imposes upon the organization which begins and conducts a movement of such importance a grave responsibility. It has, by its voluntary act, created dangers, and should therefore be vigilant in averting them. It has, by the concerted action of many, aroused passions which, uncontrolled, threaten the public peace; it therefore owes society the duty of exerting its power to check and confine these passions within the bounds of reason and of law. Such organizations should be the powerful coadjutors of government in maintaining the peace and upholding the law. Only so can they deserve and attain the respect due to good citizenship, and only so can they accomplish the beneficent ends which for the most part they were created to attain.

A labor or other organization whose purpose can only be accomplished by the violation of law and order of society has no right to exist.

The Right to Remain at Work.

The right to remain at work where others have ceased to work, or to engage anew in work which others have abandoned, is part of the personal liberty of a citizen, that can never be surrendered, and every infringement thereof merits, and should receive the stern denouncement of the law. All government implies restraint, and it is not less, but more, necessary in self-governed communities than in others to compel restraint of the passions of men which make for disorder

and lawlessness. Our language is the language of a free people, and fails to furnish any form of speech by which the right of a citizen to work when he pleases, for whom he pleases, and on what terms he pleases, can be successfully denied. The common sense of our people, as well as the common law, forbids that this right should be assailed with impunity. It is vain to say that the man who remains at work while others cease to work, or takes the place of one who has abandoned his work, helps to defeat the aspirations of men who seek to obtain better recompense for their labor and better conditions of life. Approval of the object of a strike, or persuasion that its purpose is high and noble, cannot sanction an attempt to destroy the right of others to a different opinion in this respect, or to interfere with their conduct in choosing to work upon what terms and at what time and for whom it may please them so to do.

The right thus to work cannot be made to depend upon the approval or disapproval of the personal character and conduct of those who claim to exercise this right. If this were otherwise, then those who remain at work might, if they were in the majority, have both the right and power to prevent others, who choose to cease to work, from so doing.

This all seems too plain for argument. Common sense and common law alike denounce the conduct of those who interfere with this fundamental right of the citizen. The assertion of the right seems trite and commonplace, but that land is blessed where the maxims of liberty are commonplaces.

The Boycott.

It also becomes our duty to condemn another less violent, but not less reprehensible, form of attack upon those rights and liberties of the citizen which the public opinion of civilized countries recognizes and protects. The right and liberty to pursue a lawful calling and to lead a peaceable life, free from molestation or attack, concerns the comfort and happiness of all men, and the denial of them means destruction of one of the greatest, if not the greatest, of the benefits which the social organization confers. What is popularly known as the boycott (a word of evil omen and unhappy origin) is a form of coercion by which a combination of many persons seek to work their will upon a single person, or upon a few persons, by compelling others to abstain from social or beneficial business intercourse with such person or persons. Carried to the extent sometimes practiced in aid of a strike, and as was in some instances practiced in connection with the late anthracite strike, it is a cruel weapon of aggression, and its use immoral and anti-social.

To say this is not to deny the legal right of any man or set of men voluntarily to refrain from social intercourse or business relations with any persons whom he or they, with or without good reason, dislike. This may sometimes be unchristian, but it is not illegal. But when it is a concerted purpose of a number of persons not only to abstain themselves from such intercourse, but to render the life of their victim miserable by persuading and intimidating others so to refrain, such purpose is a malicious one, and the concerted attempt to accomplish it is a conspiracy at common law, and merits and should receive the punishment due to such a crime.

Examples of such "secondary boycotts" are not wanting in the record of the case before the Commission. A young schoolmistress, of intelligence, character and attainments, was so boycotted, and her dismissal from employment compelled for no other reason than that a brother, not living in her immediate family, chose to work contrary to the wishes and will of the striking miners. A lad, about 15 years old, employed in a drug store, was discharged, owing to threats made to his employer by a delegation of the strikers, on behalf of their organization, for the reason that his father had chosen to return to work before the strike was ended. In several instances tradesmen were threatened with a boycott—that is, that all connected with the strikers would withhold from them their custom and persuade others to do so—if they continued to furnish the necessities of life to the families of certain workmen who had come

under the ban of the displeasure of the striking organizations. This was carrying the boycott to an extent which was condemned by Mr. Mitchell, president of the United Mine Workers of America, in his testimony before the Commission, and which certainly deserves the reprobation of all thoughtful and law abiding citizens. Many other instances of boycott are disclosed in the record of this case.

In social disturbances of the kind with which we are dealing, the temptation to resort to this weapon oftentimes becomes strong, but is none the less to be resisted. It is an attempt of many, by concerted action, to work their will upon another who has exercised his legal right to differ with them in opinion and in conduct. It is tyranny, pure and simple, and as such is hateful, no matter whether attempted to be exercised by few or by many, by operators or by workmen, and no society that tolerates or condones it can justly call itself free.

Some weak attempt was made at the hearings to justify the boycotts we have been describing, by confusing them with what might be called, for convenience sake, the primary boycott, which consists merely in the voluntary abstention of one or many persons from social or business relations with one whom they dislike. This indeed might amount to a conspiracy at law, if the ingredient of malicious purpose and concerted action to accomplish it were present, but whether this be so or not, the practical distinction between such a boycott and the one we have been reprobating is clear.

It was attempted to defend the boycott, by calling the contest between employers and employees a war between capital and labor, and pursuing the analogies of the word, to justify thereby the cruelty and illegality of conduct on the part of those conducting a strike. The analogy is not apt, and the argument founded upon it is fallacious. There is only one war making power recognized by our institutions, and that is the Government of the United States, and of the States in subordination thereto, when repelling invasion or suppressing domestic violence. War between citizens is not to be tolerated, and cannot, in the proper sense, exist. If attempted, it is unlawful, and is to be put down by the sovereign power of the State and nation.

The practices which we are condemning would be outside the pale of civilized war. In civilized warfare women and children and the defenseless are safe from attack, and a code of honor controls the parties to such warfare which cries out against the boycott we have in view. Cruel and cowardly are terms not too severe by which to characterize it.

Blacklisting.

Closely allied to the boycott is the blacklist, by which employers of labor sometimes prevent the employment by others of men whom they have discharged. In other words, it is a combination among employers not to employ workmen discharged by any of the members of said combination. This system is as reprehensible and as cruel as the boycott, and should be frowned down by all humane men. Happily there was little evidence of its existence among the operators in the anthracite region, one case only having been distinctly proved, and in that the refusal to employ the tabooed men continued but for a short time. Wherever it is practiced to the extent of being founded upon an agreement or concerted action, it, too, comes within the definition of the crime of conspiracy, and as such should be punished. There is also a civil remedy open to one who suffers from having been blacklisted, in an action against those who are a party to it, to recover damages compensatory of the injury received.

The Commission is fully aware of the difficulties inherent in this subject. It is a psychological matter beyond rules and awards unless the law making powers of the community fix a penalty upon boycotting and blacklisting. Even then the various degrees to which the two can be carried elude the enforcement of a statute. The Commission is of opinion, however, that there should be a positive utterance on its part relative to discrimination, interference, boycotting and blacklisting, and this opinion it has put in the form of an award, as follows:

It is adjudged and awarded: That no person shall be

refused employment, or in any way discriminated against, on account of membership or nonmembership in any labor organization; and that there shall be no discrimination against, or interference with, any employee who is not a member of any labor organization by members of such organization.

The Moral Side of Business.

The admirable annual report of F. N. Hoffstot, president of the Pressed Steel Car Company, contains the following suggestive paragraphs:

The moral side of a business corporation may probably be looked upon as an odd side, but it is a most important one. When your management began their work in 1901 their endeavor was to secure an organization which would be loyal, satisfied to follow the fortunes of the company, and rise and fall through their successes; and a large percentage of the employees of the company promptly accepted this view. Late in the year 1901, however, a fire, which evidently had been smouldering in the ranks for some time, broke out and a great many employees left at one time, finding that they were unable to adapt themselves to the policy which had been laid out. We are happy to say that the company, both morally and financially, leaped forward to success from that time on, thus indicating that the deserters had not been in harmony with our policy, but a detriment to it, and confirming our judgment that an organization with every man working hard, honestly and faithfully in the interests of the company will produce the very best results. This is the case to-day. Nearly all of the positions vacated were filled by people in the next subordinate position, and the work has been done more efficiently than ever before. It is your management's desire to build up an organization in the company's works similar to that of the Carnegie Steel Company and the Pennsylvania Railroad, where every man knows that he will reach the highest position for which his ability fits him, and that he will make money and reputation for himself, in degree with the success of his company, by contributing his entire thought, brains and energy toward their welfare.

At the McKee's Rocks plant we had some difficulties among the laboring men, who are largely foreigners, and who in the past had been levied upon for payments in order to be maintained in their positions. This has all been changed, and since the early part of the year there has been no trouble with labor. From time to time during the past year the heads of the departments have met together and compared notes, each helping the other, and early in August we met around a common board for dinner, which gave every man present an opportunity to be heard. The dinner produced such good results that we told the men that if they continued to do as well as heretofore we would have another dinner before the close of the year. As the volume of business continued to grow and the output of our works increased, it was decided to give this dinner on December 20, and on the evening of that day 138 heads of departments met together to dine. On this occasion a plan was outlined, growing out of a suggestion of James A. Blair, who is now one of your directors, to give such employees as might desire it an opportunity of acquiring an interest in the company. The offer was made to carry preferred stock for such employees at 4 per cent. interest, secured by the company's own 7 per cent. preferred stock, and we are happy to say that it has been very largely availed of by your company's employees. At the same time it has been very carefully made known that the holding or nonholding of stock will not affect the positions of our men in any way. Our whole desire has been to impress upon the men clear through that there is no favoritism in our concern; that every one has an equal chance to reach the top, and that the aim of our men should be to join in any efforts to lower our cost sheets in order to make better and greater product at reduced costs. Many of our stockholders who have visited our works state that they have noticed among our employees a spirit of enterprise and earnestness rarely seen in similar works.

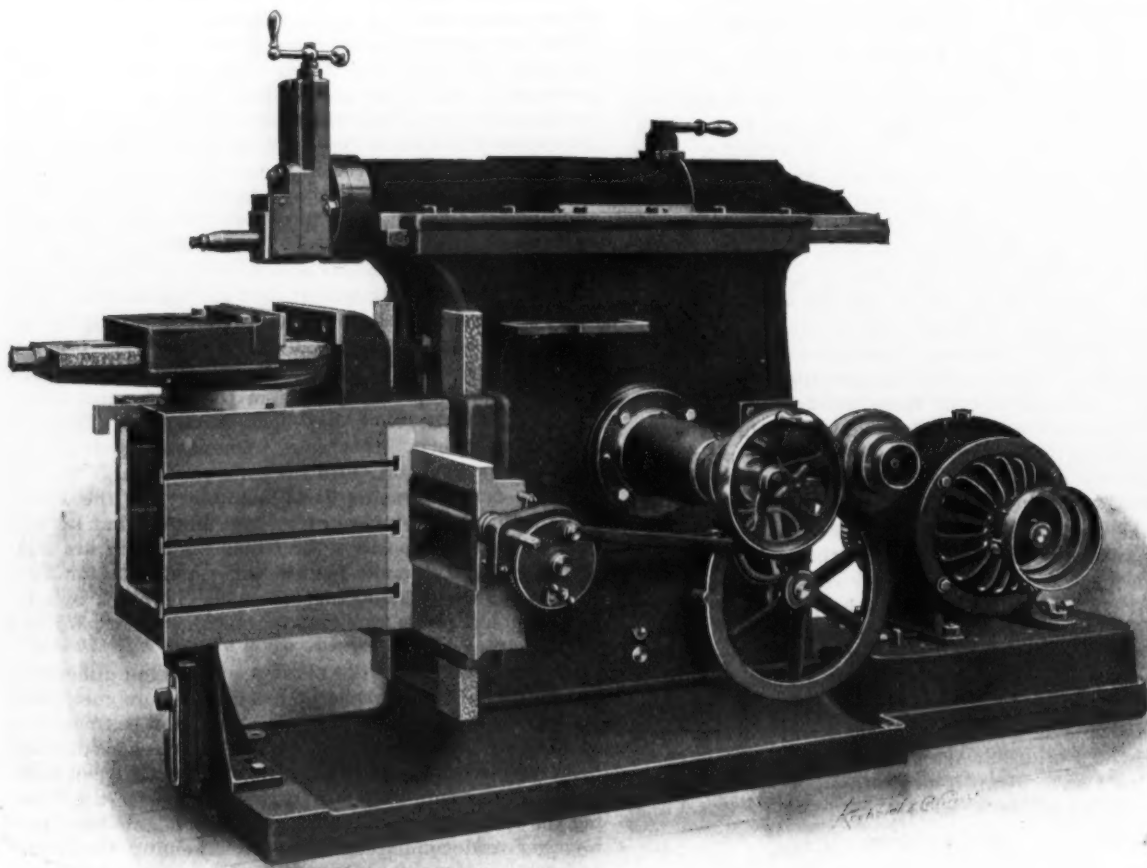
Brunot's Island Power Station.

At Pittsburgh recently the Pittsburgh Railways Company awarded most of the contracts for the equipment of the large new power station which they are erecting on Brunot's Island, the buildings for which are well under way. Six dynamos will furnish the power. Each will have a capacity of 1500 kw., or about 2000 horse-power, and the six will be furnished by the Westinghouse Electric & Mfg. Company. Each dynamo will be operated by cross-compound Corliss engine, for which the contract has been awarded to Rice & Sargent, Providence, R. I. The engines will each have a rated capacity of 2000 horse-power. Their construction will be such as to allow of their carrying an overload of nearly 50 per cent. in case of an emergency. Thus,

The contract for it has been awarded to the Morgan Engineering Company of Alliance, Ohio. The pumping plant, which will cost in the neighborhood of \$150,000, will be located in one end of the building, of which the dimensions will be 142 x 490 feet.

A New Motor Driven Shaper.

The method of electrically driving the shaper built by the American Tool Works Company of Cincinnati is clearly shown in the accompanying engraving. The motor is mounted on a substantial base directly back of the column. It is of the constant speed type, the proper variation in cutting speed of the ram being obtained through a pair of properly proportioned cone pulleys. One of these is mounted directly on the armature shaft



NEW MOTOR DRIVEN SHAPER.

while the power plant will have a rated capacity of 12,000 horse-power, it will be capable of developing about 18,000 if necessary. Each engine will receive its supply of steam from an individual set of boilers, there being two boilers to each set, and the operation of each set of boilers will be independent of that of the others. The contract for the boilers has been awarded to the Babcock & Wilcox Company of New York. Each engine will be coupled direct to a dynamo; thus, with each engine receiving its supply of steam from an individual set of boilers, forming a unit that will be capable of meeting almost any emergency. In fact, with the manner in which the switchboard will be arranged, each unit will in itself be a complete power plant. To carry out this arrangement the building for the power plant will in reality be a double building. That is, the engine and dynamo room will extend the full length and be separated from it by a brick wall, and also extending the full length will be the boiler room. Each set of boilers will be located directly opposite the engine to which it will supply steam. Running the full length of the building will be an overhead tramway for a crane, which will have a carrying capacity of 50 tons.

and the other on a stud on the column. The cone on the stud carries a pinion which meshes into a large gear on the end of the driving shaft. This arrangement gives the belt a high velocity.

At Jefferson City, Mo., on March 20, fines of \$5000 each were levied against the Armour, Cudahy, Swift, Hammond and the Schwarzschild & Sulzberger packing companies, defendants in the ouster proceedings brought last summer by the Attorney-General of Missouri against the alleged beef combine. The companies were also ordered to pay the costs of the case, which amount to \$5000. The court orders that unless the fines and costs shall have been paid within 30 days the defendants will be ousted from the State.

The British investing public takes kindly to industrial consolidations. A cable dispatch from London, dated March 20, states that 50,000 shares of the Scotch locomotive combination, which were offered for public subscription, have been subscribed for 14 times over. The shares are £10 each. In other words, £7,000,000 were subscribed for £500,000 of stock.

Coal, Iron and Shipbuilding in Scotland.

Coal Declines and Iron Advances.

GLASGOW, March 6, 1903.—The feature of the industrial situation is the depression in coal and the improvement in iron. Our coal market is going from bad to worse, and there is more and more difficulty in getting away the weekly output, especially as the North Europe shipping season has not yet begun. It is not likely that the coming shipping season will be an active one, for the Chancellor of the Exchequer has announced that the export duty will not be removed this year, and the Germans are undoubtedly under the shelter of that duty pressing into markets heretofore supplied through ports furnished solely by Scotch and North of England coal. And it is highly probable that the home consumption will be greatly diminished this year in consequence of reduced activity in the manufacturing industries. Meanwhile the output at the collieries is as large as if everything were booming, though there is some talk of a number of the smaller collieries in the combine being shut down till better times.

The latest development in our coal market is a reduction of 1 shilling per ton in the price of splint coal for the iron works, making the figure now 8 shillings per ton at the pits. This reduction in splint coal is a happy thing to iron smelters, for it is equal to about 2 shillings 3 pence per ton of the pig iron produced, and it occurs at a time when pig iron is actively on the up grade. There has, indeed, been quite a remarkable movement both in the warrant market and in the open market since my last letter, but more in the former than in the latter. A large demand for warrants (principally Cleveland) set in from London, believed to be actuated from America, but also largely influenced by German conditions. And further, some dealers here who were previously on the bear tack have now turned bull. However that may be, under successive buying day by day prices have advanced with but slight fluctuations until Scotch warrants are now 57 shillings, Cleveland 51 shillings 6 pence and Cumberland hematite 61 shillings. The turnover has been large, but how much of it is legitimate trade one cannot tell. More steamers have been loaded on both coasts with iron for America, and the liners from the Clyde have every trip as much as they can carry. No doubt many, perhaps most, of these shipments are against orders placed some time ago, but if so they could be resold here at a fair profit if your market is now full enough of domestic iron. The situation is undoubtedly confusing, and the immediate outlook is obscure.

For makers' iron, Scotch make, quotations now are: Coltness No. 1, 71 shillings; No. 3, 59 shillings 6 pence; Gartsherrie No. 1, 65 shillings; No. 3, 59 shillings; Summerlee No. 1, 68 shillings 6 pence; No. 3, 59 shillings; Clyde No. 1, 64 shillings 6 pence; No. 3, 58 shillings 6 pence; Carnbroe No. 1, 59 shillings 6 pence; No. 3, 56 shillings 6 pence; Eglinton No. 1, 59 shillings 6 pence; No. 3, 56 shillings 6 pence; Glengarnock No. 1, 65 shillings 6 pence; No. 3, 58 shillings 6 pence; Dalmellington No. 1, 59 shillings 6 pence; No. 3, 56 shillings 6 pence; Shotts No. 1, 66 shillings 6 pence; No. 3, 58 shillings 6 pence. In Middlesbrough makers' prices for No. 3 are 51 shillings to 51 shillings 6 pence; No. 4 foundry 50 shillings 6 pence; No. 4 forge, 48 shillings; No. 1, 53 shillings 6 pence; mottled iron, 47 shillings 3 pence; white, 46 shillings 6 pence, and hematite, mixed numbers, 57 shillings 3 pence. Hematite is much below the ordinary difference between that quality and ordinary iron. As to finished material, Scotch steel makers have advanced the price of ship plates to £5 15s., and latterly to £5 17s. 6d. per ton, less 5 per cent. Only a few weeks ago plates were selling at £5 7s. 6d. to £5 10s., less 5 per cent., and some sales were reported as low as £5 net, though it is doubtful if the sellers (middlemen) were able to cover themselves with makers. Steel angles are quoted here £5 10s., and boiler plates £6 7s. 6d. to £6 10s., less 5 per cent. In the North of England, where the shipyards have so long been in a state of suspended animation, owing to the strike of the joiners, steel ship

plates are quoted £5 12s. 6d.; steel angles, £5 6s. 3d.; iron ship plates, £6 5s., and iron angles, £6 2s. 6d., all less 2½ per cent., but there is not much buying at these rates. An order has been received this week by a Glasgow firm for 25,000 tons of steel rails for Canada. The contractors are merchants, not makers, and the rails will not be made here, as Scotch steel makers gave up some time ago making steel rails in quantity, having better markets for other material. It is announced that the Mossend Steel Works are about to be shut down owing to bad trade.

Shipbuilding.

The crisis in the shipbuilding industry here is now over, all the shipyard workers having accepted the reductions proposed, the circumstances in connection with which I narrated in a previous letter. In the North of England the settlement is not yet complete, but here the yards are all as actively at work as if no difficulty had ever existed. The men realized that what the employers proposed was for the general benefit of the industry and to promote employment.

The rise in material, however, has counteracted the reduction in the labor cost of new ships, and the industry is darkened by the prospect of idle yards. Last month (February) the Scotch shipyards put out 29 vessels, of an aggregate of 41,730 tons, as compared with 13 vessels, of 19,800 tons, in January last, and with 28 vessels, of 47,200 tons, in February, 1902. Against the 41,730 tons of launches the new orders booked in February would hardly amount to 30,000 tons, including three large cargo boats for the Elder-Dempster lines. It is reported that the Canadian Pacific Railway Company are going to build here four steamers of 10,000 tons each, to augment the Beaver fleet they have acquired from Elder, Dempster & Co., but there is yet no official record of the contracts.

The proposed construction of a naval base and dockyard in the Firth of Forth is, of course, a matter of great importance to the shipbuilding industry of Scotland, especially in relation to labor.

B. T.

The Frankford Steel Company.—On March 12 there was chartered at Trenton, N. J., the Frankford Steel Company, who have taken over the business of Wm. & Harvey Rowland, Incorporated, at Frankford, Pa., also known as the Oxford Iron & Steel Works. The plant was built in 1835 at Tacony Creek, but was removed to Frankford, a suburb of Philadelphia, in 1849. It is equipped with two 12-inch, one 16-inch and one 18-inch trains and one hammer and makes Bessemer and open hearth sheet, machinery, spring, hammer, fork, rake and hoe steel and rerolls Norway iron and nail rods. The new company propose to bring the plant up to date and have already placed contracts for crucible steel furnaces, gas producers, hammers and new roll trains. The officers of the company are Dudley G. Gautier, president; William C. Pearson, vice-president, and Henry R. Bugie, secretary and treasurer. Charles T. Evans, who is the general manager, was formerly the manager of the steel works of Henry Disston & Sons, of Tacony, Pa. D. G. Gautier & Co. of 32 Cliff street, will act as selling agents for the company in New York and vicinity. William & Harvey Rowland, Incorporated, of Frankford, Philadelphia, will continue to operate the spring department of the business, which embraces the manufacture of carriage and wagon springs of every description.

The Pere-Marquette to Bridge the Niagara.—It is authoritatively stated that it is the intention of the Pere-Marquette Railroad to build a railroad bridge across the gorge at Niagara Falls, between the cantilever bridge of the Michigan Central Railroad and the steel arch highway bridge. The officials of the road, after giving the matter much attention, decided that Buffalo could be entered more easily by a bridge across the gorge than via the Grand Island route, where boats would have to be used for the Canadian Channel. It is stated that work on the bridge will be commenced shortly, and that the structure will be a fine specimen of engineering.

Proposals Invited for Three Battle Ships.

WASHINGTON, D. C., March 24, 1903.—The Secretary of the Navy announces that on June 3 bids will be opened for the construction of the three first-class battle ships of 16,000 tons which were recently authorized by the naval appropriation act of 1903, to cost, exclusive of armor and armament, not exceeding \$4,212,000 each.

In general characteristics these three vessels will closely resemble the sister ships "Louisiana" and "Connecticut," now under construction, but in the matter of armor there will be an important departure which it is believed will give greater protection without adding to the weight carried. The general dimensions and features are as follows: Length of load water line, 450 feet; breadth, extreme, at load water line, 76 feet 10 inches; displacement on trial, not more than 16,000 tons; mean draft to bottom of keel at trial displacement, 24 feet 6 inches; gross draft, full load, about 26 feet 9 inches; total coal bunker capacity, about 2200 tons; coal carried on trial, 900 tons; feed water carried on trial, 66 tons.

The main battery will consist of four 12-inch breech loading rifles, eight 8-inch breech loading rifles, and 12 7-inch breech loading rifles, while the secondary battery will include 20 3-inch 14-pounder rapid fire guns, 12 3-pounder semiautomatic guns, six 1-pounder automatic guns, two 1-pounder semiautomatic guns, two 3-inch field pieces, two machine guns, caliber 0.30, and six automatic guns, caliber 0.30.

The 12-inch guns will be mounted in pairs in two elliptical turrets on the center line, one forward and one aft, and the 8-inch guns in pairs in four elliptical turrets, two on the beam at each end of the superstructure. The 7-inch guns will be mounted in broadside on pedestals on the gun deck behind 7-inch armor, each gun being isolated by splinter bulkheads of nickel steel from 1½ to 2 inches thick. The secondary battery will be distributed according to the usual arrangement, which was followed in the specifications for the "Louisiana" and "Connecticut."

Armor Protection.

The total weight of armor to be used will approximate 4000 tons. The hull is protected at the water line by a complete belt of armor 9 feet 3 inches wide, having a maximum thickness of 9 inches for about 280 feet amidships. In the "Louisiana" and "Connecticut" this belt had a thickness of 11 inches, but extended only 200 feet, and it is believed that the new arrangement, while employing lighter armor, will give materially increased protection. Forward and aft of the main belt the thickness is gradually decreased to 4 inches at the stem and stern, but the extension of the maximum thickness according to the new design will completely cover the magazines.

Another important change is made in the lower casemate armor, which extends to the limits of the magazine spaces and reaches from the top of the water line belt to the lower edge of the 7-inch gun ports on the main deck. In the "Louisiana" and "Connecticut" this armor was but 6 inches in thickness, but in the new ships it will be increased to 7 inches, while the athwartship bulkheads at the ends of this casement will be but 6 inches thick.

The casemate armor around the 7-inch guns on the gun deck is 7 inches thick, and the splinter bulkheads are from 1½ to 2 inches thick. The protection of 3-inch guns is nickel steel 2 inches thick. The upper casemate athwartship armor extending from the shell plating to the 12-inch barbettes is to be 7 inches thick throughout.

The 12-inch barbettes extend from the protective deck to about 4 feet above the main deck and consist of 10 inches of armor in front and 7½ inches in the rear above the gun deck. Between the gun deck and protective deck there will be a uniform thickness of 6 inches. The barbettes will not have any special framing, the connection of the armor to the decks being sufficient. The 12-inch turrets will have a front plate 12 inches thick, rear plates 8 inches thick, and top plates 2½ inches thick. The 8-inch barbettes will be 6 inches thick in front and 4 inches thick in rear, with

the upper tube 3¾ inches thick and the lower tube 3 inches thick. The 8-inch turret front plate will be 6½ inches thick, the rear plates 6 inches and the top plates 2 inches thick. The conning tower and shield will each be 9 inches thick; signal tower 6 inches thick. An armor tube 36 inches in diameter will extend from the base of the conning tower to the protective deck and will be 6 inches thick throughout.

Teak backing of a minimum thickness of 3 inches will be fitted behind all the side, athwartship, and 12-inch turret armor; 2 inches of backing to be fitted behind the 8-inch turret armor; other armor will be fitted without backing. All the above mentioned armor will be supplied by the Government and will be fitted in place by the ship contractor, but all nickel steel protection, with rivets, butt straps and other connections, will be both furnished and fitted by the contractor.

Propelling Machinery.

The engines will be of the vertical, twin-screw, four-cylinder, triple-expansion type, of a combined indicated horse-power of 16,500. The steam pressure will be 250 pounds. The stroke will be 4 feet. The ratio of high pressure to low pressure cylinder will be at least 1 to 7, and the diameters will be sufficient for the required indicated horse-power at about 120 revolutions per minute. Each engine will be located in a separate water tight compartment. They will be provided with all the necessary auxiliaries and accessories in accordance with the latest practice of the Bureau of Steam Engineering. There will be 12 Babcock & Wilcox boilers placed in six water tight compartments. They will have at least 1100 square feet of grate and 46,750 square feet of heating surface, and must be able to furnish steam for the main engines, and all the necessary auxiliaries and accessories will be provided for the efficient working of the boilers. There will be three funnels, each 100 feet high above the base line.

W. C. L.

The Use of Magnetic Ore in the Manufacture of Bessemer Pig.

Magnetic iron ore is not usually regarded with favor by blast furnacemen, who base their objections on its resistance to reduction, the large amount of fuel required, the difficulty of introducing sufficient graphite and silicon into the pig and, in some cases, the further difficulty of keeping down the sulphur. Laboratory experiments, particularly those of Professor Akerman, as to the reducibility of this material tend to justify these unfavorable opinions, but that much can be said on the other side is shown by a recent paper in *Stahl und Eisen*, of which the present article is a summary.

The reducibility of ores depends on their chemical composition; or, in other words, the degree of oxidation of the iron. To reduce ferrous ferric oxides and silicates, solid carbon is required, and, as ferrous oxide requires changing to a higher degree of oxidation, probably to ferrous ferric oxide, before reduction can take place, ores containing this compound are also insusceptible to indirect reduction. Although these facts cannot be doubted, more detailed consideration shows that the bad results which might be expected are greatly modified by other circumstances.

In the first place, very rich ores cannot be used alone, as a certain amount of slag is necessary for the proper working of the furnace, and a burden containing more than 70 per cent. magnetite is impracticable. As this ore has a greater specific weight than others, a charge containing the above percentage of the same will take up less room than one consisting entirely of softer ores. In furnaces of equal size, the one working with magnetic ore will hold more charges than the other, so that, with equal blast, the weight of coke burned and impurities slagged off is the same, but the volume is different. Each charge therefore remains longer in the furnace subjected to the conditions existing there and, in consequence, the 30 per cent. of soft ore, by being mixed with the magnetite, is more completely reduced than would otherwise be the case, especially in so far as it is susceptible to indirect reduction. This means a saving in coke, which, in part at any rate,

counterbalances the extra fuel demanded by the magnetic ore.

Furthermore, the fact that the materials remain longer in the furnace also favors the introduction of silicon and graphite into the pig, and in this respect also the softer ores will greatly modify the harm done by that which is more infusible, it being understood that the number of charges per day is the same in both cases. There is no trouble in getting rid of sulphur as a sufficient basic slag must in any case be used. The amount of sulphur in the iron does not depend so much on the quantity present in the ore as on the silicon contents of the pig iron, or, in other words, on the temperature at which the furnace is run. When making low silicon iron, the sulphur can be kept down by means of manganese.

The above considerations, leading to the conclusion that Bessemer pig of the usual composition can be made without trouble from Swedish magnetite, are corroborated by the practical results detailed below. These results were obtained at the Witkowitz Works in Upper Silesia during the last three years, the said works having, after some months of experimenting, entirely abandoned the use of Spanish hematites and substituted Swedish magnetites for the manufacture of Bessemer iron.

The Freja magnetite mentioned in the tables is of the following composition: FeO, 30.63; Fe₂O₃, 64.20; MnO, 0.15; CaO, 0.40; MgO, 0.35; Al₂O₃, 0.44; P₂O₅, 0.05; insoluble material, 3.86 (SiO₂, 2.02; Al₂O₃ + Fe₂O₃, 0.40; CaO, 0.50; MgO, 0.16). Total iron, 69.04; sulphur, 0.09.

Table I shows the burden used and results obtained formerly at the works in question; Table II the same thing after substituting magnetic for Spanish ore.

Table I.

Material.	Lbs.	Fe.	P.	Mn.	Cu.	SiO ₂ .	Al ₂ O ₃ .	CaO.	MgO.
Coke	5,070	61	4.05	2.02	0.50	258.6	172.3	63.7	27.9
Spanish spathic	2,866	1,607	0.28	29.23	....	310.8	65.9	37.2	106.0
Freja mag- netic	1,102	735	0.22	1.32	....	34.1	21.8	17.2	6.8
Clay ore	661	381	0.08	0.57	....	211.6	43.2	2.0	1.1
Purple ore	1,102	596	0.11	0.99	0.66	47.4	14.3	4.4	3.3
Limestone	1,763	....	0.35	....	....	....	....	....	....
Total ore	5,731	3,380	5.09	34.13	1.16	862.5	317.5	124.5	145.1
Product—									Pounds.
Iron									3,382
Manganese									273
Carbon, silicon and phosphorus									218
Total									3,873
Coke used per ton (2,240 pounds), pig iron									2,935
Analysis of the iron: Silicon, 2.4 to 3.2; phosphorus, 0.14; manganese, 0.80; total carbon, 3.80; sulphur, 0.02; copper, 0.04.									

Table II.

Material.	Lbs.	Fe.	P.	Mn.	Cu.	SiO ₂ .	Al ₂ O ₃ .	CaO.	MgO.
Coke	8,598	103	6.87	3.43	0.85	438.3	292.2	108.0	47.0
Purple ore	2,204	1,192	0.22	1.98	1.32	94.8	28.6	8.8	6.6
Freja mag- netic	6,944	4,635	1.38	8.32	....	215.1	137.4	108.9	43.5
Clay ore	552	318	0.22	1.43	....	529.0	80.8	5.3	2.6
Limestone	3,086	....	0.61	....	....	....	....	....	....
Total ore	9,700	6,248	9.30	15.16	2.17	1,277.2	539.0	231.0	99.7
Product—									Pounds.
Iron									6,250
Manganese									11
Carbon, silicon and phosphorus									374
Total									6,635
Coke used per ton (2,240 pounds) pig iron									2,900

With the burden shown in Table II, the magnetite amounts to 71.6 per cent. of the total ore charged and contains 74.1 per cent. of all the iron. Instead of the low silicon which was feared, the results showed an increase of that element as exemplified by the following figures taken from the analysis book: Silicon: 3.08, 3.45, 3.15, 3.65, 3.66, 3.33, 4.99, 3.85, 3.40, 3.36, 3.01, 3.92, 3.03, &c. As the iron was intended for ingot molds, this seemed too high. Colder blast was used, and the following figures were obtained: Silicon: 2.50, 2.88, 2.43, 2.83, 2.68, 2.70, 2.28, 2.42, 2.59, 2.82, &c. The percentage of carbon in the iron was as follows: Total Carbon: 3.72, 3.88, 3.76, 3.73, 3.79, 3.69, 4.09, 3.73, &c.

The production of the furnace was increased by the change, owing to the larger percentage of iron in the charge. As shown by the tables, the amount of coke used was slightly less with magnetite than with softer ore. The furnace ran well and showed less disposition to hang than was previously the case, which was doubt-

less due to the fact that, owing to the high specific gravity of the magnetite, the coke took up proportionately more room, causing greater looseness in the volume of material.

Preparing for Foreign Business.

The Pressed Steel Car Company are getting ready for foreign business, when the time comes to take hold of it. The annual report by the president, F. N. Hoffstot, presents the subject in the following words:

While there is nothing visible in the immediate future to prevent a continual increase in the volume of our business, yet, judging by the past, we may expect cycles of depression, when, from bad crops or other unforeseen disasters, railroads will discontinue the present large purchases of new equipment and postpone repairs. We believe that when this time comes we shall have so perfected our works and reduced our costs that we will be able to build steel cars as cheaply as wooden cars. Statistics concerning the rapid depletion of our great forests show that we cannot expect the price of wood to decrease, while we know that it is possible to reduce the cost of steel. We have, therefore, nurtured our foreign relations, and have been doing good missionary work in South America, Australia Africa, England and its colonies, and the Continent of Europe, studying particularly their special requirements for workmanship and the application of our methods of car construction to the local conditions of these countries. To do this we have maintained for several years past an office in London, equipped with a corps of engineers, who conduct correspondence in five modern languages and furnish drawings in both meters and inches. Their drawing work has frequently been complimented by the various railroad authorities in Europe. Thus in the event of a depression of business in America, we have the foundations laid for a world wide trade. The whole world is rarely under a cloud at one time, and we feel fairly confident of getting a share of the business of foreign railways, notwithstanding their loyalty to home industries. The foreign manufacturer is not like his American brother. When he gets a largely increased volume of business he does not rush off and increase his plant and put more money into bricks and mortar, but he sits down contentedly and reaps the reward. So that when there is an excess demand in Europe, and the price of raw materials in this country permits it, we believe we can get a share of this excess demand. We are always in a good position to take care of this work, having behind us the able support of the United States Steel Corporation, whose managers are quite alive to this important situation, and from whom we purchase our entire requirements of raw material.

It has been frequently stated that this company's output has been restricted owing to their inability to get raw material in sufficient quantities from the United States Steel Corporation. While this is true, it is only proper for us to state that it was not on account of any lack of co-operation on the part of that company, but simply that the great growth of this business had made demands on the United States Steel Corporation greater than they had anticipated or equipped themselves to meet. Besides this, the peculiarly congested freight conditions surrounding their works have prevented them from getting the maximum output of their own plants; but we can assure you that we have had their hearty co-operation and support at every point, and that they are making every effort to put us in a position to get out the maximum product of our works. Before the present year is out we hope to be able to schedule 130 or more cars per day from our combined Allegheny and McKee's Rocks works. We have also closely followed the example of the United States Steel Corporation in keeping our prices down, so as not to abbreviate this era of prosperity. We are to-day the largest single consumers of steel in the world, and we hope to hold that position for many years to come.

The spring meeting of the American Society of Mechanical Engineers is to be held at Saratoga, N. Y., beginning June 22, 1903.

Liberalizing the Drawback System.

WASHINGTON, D. C., March 24, 1903.—The Secretary of the Treasury has undertaken a thorough investigation of the methods and *personnel* of the customs service with a view to substituting modern business practice for antiquated routine and energetic officials for those whose days of usefulness in the service are over. Particular attention is being paid to the large staff of special agents, and numerous changes are in prospect. No division of the service is being more rigidly investigated than that having charge of drawback allowances, for Secretary Shaw is of the opinion that, inasmuch as exporting manufacturers cannot hope for relief from Congress within the next 10 or 12 months, the Department should do what it can to abolish all unnecessary red tape and to encourage manufacturers to take advantage of the existing laws. In this work the Secretary is being ably seconded by the new Assistant Secretary in charge of customs, Mr. Armstrong, who shares with his chief the opinion that the drawback laws of the United States might with safety be rendered quite as liberal as those in France.

Brown & Sharpe Favor the Lovering Bill.

The arguments recently filed with the Ways and Means Committee by certain subordinate officials to show that the present drawback law is entirely adequate are being sharply assailed by leading manufacturers, who have taken the matter up with prominent Senators and Representatives. The Brown & Sharpe Mfg. Company of Providence, R. I., in forwarding a memorial in favor of the Lovering bill, take issue with the contention that the present law is adequate and present their case very forcibly, though briefly, as follows:

"While, undoubtedly, the drawback law was intended to facilitate business with foreign countries, as a matter of fact, in our business, we are not able to take advantage of a single cent under the statute, for the reason that with the necessity of accurately tracing the stock we are not able to fill the intricate requirements of the law. For example, we export in large quantities cutters, every one of which is made of imported steel; but it is an absolute impossibility for us to designate strictly the date on which we receive the steel of which these are made. To illustrate: If we take a single bar, different cutters may be made from this bar and their shipment would extend over four or five years in some cases. It seems to us that this Lovering bill will give us an opportunity of deriving benefit from the law as originally intended."

The Drawback on Lead.

Senator Perkins of California is in receipt of an interesting statement from George L. Underhill of the Selby Smelting & Lead Company of San Francisco, who is also a member of the committee of manufacturers organized to secure the amendment of the drawback laws. Mr. Underhill devotes himself especially to answering the statements filed with the Ways and Means Committee by Deputy Collector J. A. Cryan, in charge of the drawback division in the New York custom house. In referring to Mr. Cryan's strictures upon section 1 of the Lovering bill, Mr. Underhill says: "Mr. Cryan speaks of the ambiguity of section 1 of the bill, but if there is any ambiguity in this section it works against the manufacturer rather than the Government." Taking up the particular portion of Mr. Cryan's statement applying to lead, in which he contended that a manufacturer exporting articles made from lead withdrawn from a bonded warehouse was only entitled to a refund of 92 per cent. of the duties paid thereon, Mr. Underhill says:

"There seems to be considerable confusion in the minds of Treasury officials and members of Congress as to the relations existing between bonded lead smelters and lead manufacturers. The two interests are entirely separate and independent of each other, and I do not know of any other company in the United States but the Selby Smelting & Lead Company who combine both smelting and manufacturing in the one company. It will be necessary now to show you the difference in

operation existing between the bonded smelter and the lead manufacturer, in conducting business with bonded lead. Lead can be imported in three ways: First, in lead bearing ores, on which there is a duty of 1½ cents per pound on the lead contained; second, in lead bullion containing more or less of the precious metals, on which there is a duty of 2¼ cents per pound on the weight of the bullion, and third, in refined pig lead, on which there is a duty of 2¼ cents per pound.

"The first article, lead bearing ore, is smelted and refined by the bonded smelter in bond, and after the lead contents of the ore have been ascertained by the Government assayer, a quantity of lead equal to 90 per cent. of the ascertained contents of the ore is locked up in the warehouse by the Government official, which lead has been taken from a general lead pile existing in the smelter, and if this 90 per cent. of lead is exported, the Government cancels the bond. On the second class—that is, lead contained in lead bullion—the Government locks up in the bonded smelter 90 per cent. of the weight of the bullion, and if this 90 per cent. is exported, the bond is canceled, the same as is done in the case of lead extracted from lead ores. The bonded smelter, of course, is not interested in the third class, being foreign refined pig lead imported in the shape which can be immediately used by manufacturers.

"We will now turn to the lead manufacturer. If he buys from the bonded smelter lead which has been extracted from ore, he gets only 90 per cent., but pays duty on 100 per cent. of the contents of the original importation of ore. If the manufacturer now exports practically the entire quantity of the lead which he has purchased from the bonded smelter, being 90 per cent. of the original contents of the importation of ore, the Government allows him a drawback practically equal to the duty which he paid. In other words, the Government puts the manufacturer exactly in the same position as it does the bonded smelter, with reference to lead extracted from ores.

"If the manufacturer purchases from the bonded smelter lead which has been extracted from the lead bullion, the case is entirely different. The lead manufacturer has to pay a duty equal to 2¼ cents per pound on the original weight of the bullion received by the bonded smelter, but only gets a weight of lead equal to 90 per cent. When he has manufactured and exported this 90 per cent. he will get back 92 per cent. of the duty paid, 2 per cent. being allowed for waste, leaving a loss of 8 per cent., which seriously handicaps him. If, now, the manufacturer buys foreign refined pig lead, he pays a duty of 2¼ cents per pound thereon and practically gets it all back, if he exports manufactures made from the entire quantity.

"The question will probably arise in your minds, why does the manufacturer have to stand this loss, and why does he not fall back upon the bonded smelter? If you will refer to the operations of the law, outlined above, with reference to exportation of pig lead refined from foreign lead bullion, you will see that the bonded smelter gets its bond canceled on the exportation of 90 per cent. of the weight of the bullion, and consequently suffers no loss. Now, as the bonded smelter, having a market for pig lead for export, is not going to sell its bonded pig lead at any less price to the manufacturer than it can be sold for export in the pig shape, it follows that if the manufacturer is going to use this class of material, he has got to suffer the loss of about 8 per cent. of the duty paid."

Section 7 of the Lovering bill fully meets the difficulty of which Mr. Underhill complains and would enable an exporter of products manufactured from lead produced from bullion in bonded smelter to receive back the full amount of duty paid thereon, the same as would be the case had he imported pig lead as his raw material. This section is strongly favored not only by manufacturers of lead pipe, sheet lead, shot, &c., but also by those who make a business of corroding lead for the manufacture of paints, &c.

W. L. C.

It is reported from authoritative sources that a new shipbuilding company, capitalized at \$1,000,000, will

establish a shipyard near Bridgeburg, Ontario, opposite Buffalo, N. Y., and that it will be one of the largest yards on the Great Lakes. A tract of 350 acres has been purchased for the purpose, and work of construction on the yards will be begun at once. The company will be controlled by financiers interested in the Toronto & Niagara Power Company.

American Machinery in Japan.

An idea of the remarkable foothold which American machinery has obtained in Japan can be had in no better way than to note the interest which the American manufacturers have taken in the Fifth Industrial Exposition at Osaka, which opened March 1, and is to continue until August 1. This exposition is the largest ever held in Japan, as it covers an area of 100,000 tsubos (one tsubo contains 36 square feet). It is made up of the usual industrial attractions which attend such expositions as the recent Pan-American or the Charleston

pany, Gisholt Machine Company, Skinner Chuck Company, H. W. Johns-Manville Company, Hart Mfg. Company, Buffalo Forge Company, Acme Machine Company, J. L. Mott Iron Works, Columbia Phonograph Company and others, all of whom have sent a shipment of their latest improved machines.

The American Machinery Building is an imposing structure which faces the Fine Arts Building, and although the photograph herewith presented was taken before the completion of the decorations, it still gives a fair idea of the excellent manner in which Japanese workmen have carried out American ideas. The interior of the building is equipped with two line shafts running lengthwise, one 350 revolutions per minute and one 150 revolutions per minute. Power is applied to one shaft by a General Electric motor and to the other by an automatic Ideal engine, which is operated by compressed air from a Rand compressor. Among the machines to be shown in operation are a Niles boring mill, slotting machine and a universal radial drill; a Bement-Miles 350-pound steam hammer, a Brown & Sharpe auto-



AMERICAN MACHINERY BUILDING AT THE OSAKA EXPOSITION, JAPAN.

and others, but the most notable feature of this is that it is the first held in Japan at which foreigners have taken any marked interest; there being a separate building, known as the Foreign Samples Building, in which a number of German, French and English manufacturers have taken space.

The American manufacturers are represented by F. W. Horne, an enterprising American, who erected an extensive building of 7000 square feet of floor space, and having conceived the novel idea of exhibiting American machinery in actual operation, he received the ready co-operation of the following manufacturers, for whom he has been acting as exclusive agent in Japan: Niles-Bement-Pond Company, the Pratt & Whitney Company, Brown & Sharpe Mfg. Company, J. A. Fay & Egan Company, W. F. & John Barnes Company, International Pump Company, Chicago Pneumatic Tool Company, the Warner & Swasey Company, Rand Drill Company, Atlas Engine Works, A. L. Ide & Son, Bradford Machine Tool Company, Sebastian Lathe Company, William Sellers & Co., Incorporated; Morris Machine Works, Chandler & Price Company, the William Powell Company, Norton Emery Wheel Company, James Morse & Sons, Standard Tool Company, Ashcroft Mfg. Company, Hayden & Derby Mfg. Company, L. S. Starrett Com-

matic gear cutter and a Fay & Egan band mill for ripping logs up to 4 feet in diameter. The erection of the building and the installation and setting up of the machines has been under the supervision of J. A. Rabbitt, a young American engineer, who states that he has found the Japanese workmen thoroughly efficient. Americans visiting this exposition will surely be pleased with the interest taken by their countrymen, and it is also pleasing to the Japanese, for it indicates that their engineers are considering quality—viz., cheapness; as it is universally known that the productions brought in from other countries are much lower in price than the American goods.

The Chicago, Rock Island & Pacific Railway Company have placed a contract for the building of a locomotive plant near Moline, Ill., with the George B. Swift Company of Chicago, in accordance with plans and specifications prepared by the latter company. The total cost of the plant is placed by the architects at \$1,000,000. There will be 20 buildings in all, including a system of shops, an office building and a roundhouse with 48 locomotive stalls. The principal structure will be the machine shop, 276 x 848 feet.

Steam Turbines to Date.*

BY R. H. THURSTON, DIRECTOR OF SIBLEY COLLEGE,
CORNELL UNIVERSITY.

The Beginnings of the Steam Turbine.

The beginnings of the steam turbine are found in the earliest historic times and in the earliest technical literature. Its progress is shown to be wholly modern and mainly recent. Only after the evolution of the modern physical and mathematical sciences could its action be understood and the machine be properly designed; only after modern tools and methods of mechanical construction had become refined could it be built in safe and economical forms. The influence of the Alexandrian school upon modern engineering is shown to have been mainly through the philosophers who sowed the seeds of which we now see the germination and the fruit. They were necessarily dormant during the nearly 2000 years which elapsed between the days of Greek philosophy and modern, practically applied, science.

The fundamental ideas of the theory of the steam turbine are exhibited as embodied in the modern steam turbine. The transformation of energy from its thermal into its dynamic form is traced and the principles controlling the thermodynamic change and the limitation of wastes are exhibited as exemplified, both for the ideal case of the perfect machine and for the practical construction of the day. The method of development of thermal energy is exhibited and the mechanism of the process of change into dynamic form is shown.

The turbine is discovered not to be a thermodynamic machine, but to belong to the same class with the hydraulic turbine, and its design, construction and operation to be controlled by the same ultimate principles. The radical distinction between the types of the ancient Greek and of the engineer of the seventeenth century is pointed out and the influence of this difference in type upon the practical value of the invention is brought out. The limitations controlling the engineer in his design and construction due to this difference in type are exhibited and their effect upon the economic value of the turbine is shown. Notwithstanding these limitations it is found that the turbine is more nearly a perfect steam engine than any other known type, so far as its design and construction are concerned. It remains to be seen what the practical outcome is to be.

The economies and the wastes of the steam turbine are discussed and it is found that the machine, if its construction can be made perfect, will operate precisely as would its purely ideal representative. Its preliminary thermodynamic conversion of energy in the formation of its jet within the nozzle is exactly conformatory to the scientific theory of the case, and the action of the turbine itself, receiving the jet, is that which a scientific and perfect construction would illustrate, in so far as energy conversion is concerned, if the apparatus be correctly proportioned and constructed.

It is discovered, on investigation, that the wastes of the turbine, as now illustrating the best work of the time, are apparently not far different in amount from those of the best work on the older type of steam engine, the piston engine, but that these wastes are of a different sort and peculiarly distributed. The problem of their reduction is a radically different one from that of the older engine.

The Present Status of the Turbine

as respects design is shown, and its relation to the ideal standard of the engineer is examined into. The Hero turbine as used in centrifugals, the Branca type as employed in the same class of machines, the old Avery and Atwater types, and the recent forms of De Laval and Curtis, Parsons and Rateau, are shown to approach the theoretical ideal more completely than ever has or probably ever can any reciprocating engine. It does not necessarily follow that they will ultimately excel the common type of steam engine in every day practice; it simply means that to this extent they possess certain fundamental advantages. The fundamental principles of the steam turbine being now entirely familiar to the en-

gineer, its design has become one of the simple problems of construction and may be carried out with perfect comprehension of the requirements of the case, as well as of the methods of successfully meeting those demands.

The now familiar types of simple and of compound turbine illustrate the familiarity of the engineer of to-day with this task. He recognizes his limitations, as set by the weakness of his materials of construction and by the essential requirements for maximum thermal and mechanical efficiency, which make demands upon him which are in precise opposition. He effects the best compromise possible in the one case and endeavors by a modified design to evade those limitations in the other case. Various expedients and various special devices, some of them amounting to real inventions, are found to be more or less successful in effecting this improvement, and the differences among the steam turbines of the day are largely of this sort.

The fundamental principles of the compound turbine are simple and all forms of such machines are fundamentally the same in principle.

The performance of the steam turbine of the day, as observed by the lecturer and as shown by the work of many other investigators, is found to be excellent beyond the anticipations of the most sanguine among older practitioners. Figures presented show that the machine is about as economical as other engines of the same power; that its regulation may be made satisfactory and its adaptation to special purposes is remarkably perfect. It is found that while experience is not by any means as complete and judgment, therefore, not so well based as with the more familiar types of engine, the conclusion is probably well justified that this form of steam engine has come to stay and that it will find its field and a broad one in the engineering of the future.

Opportunities for improvement are found, on investigation of the theory and of the performance of the machine, comparing the predictions of a pure theory with the results obtained in a refined practice, to be very large. The direction which these improvements must take is shown clearly by experimental research and the way is clearly visible to all scientific designers and inventors. It is easily shown that there are two, and practically only two, ways of securing further gain in the efficiency of the turbine, the one involving the refinement of the construction of the machine, the other relating to the treatment of the working fluid. The method is simple in its requirements, but the practical meeting of these requirements may involve some difficulties. However that may be, the designers of to-day are competent, well informed, and have the scientific training needed. They may be expected in due time to attain a high degree of success.

The characteristic advantages of the steam turbine in its now standard forms are, for certain purposes, peculiar and very important. The adaptation of the machine to driving high speed machinery, to the turning of the armature or the field of the dynamo, to the purpose of the marine engineer, present promising problems. Their solution is already well advanced, in most cases, and we already know that the turbine may be made of use in the operation of machinery, as of alternating current generators in multiple, where the difficulties with other motors are found to be singular and serious. These advantages are illustrated by the details of the engine trials and of scientifically conducted investigations lately effected.

The Trend of Progress

and the promise for the immediate future are in the direction of further gain in economy of the machine by suppression of leakage and of friction of fluid within its casing by improved workmanship and by securing a better working substance by freeing it from water and also by utilizing the process of superheating to increase the thermodynamic range. This means, however, improvement at the boiler rather than at the engine, which latter is fitted in all its forms to employ superheated steam of any temperature that can be practically furnished from the steam generator.

The trend of progress at the moment is also toward the application of specially designed and constructed

* Abstract of lecture given before the New York Electrical Society, March 18, 1903.

turbines to special uses. It is probable that, gradually, forms will be adapted particularly to use in electric light and power plants; others will find employment as marine engines, and still others to other varieties of work. The regulation and the adjustment of speeds constitutes a problem, already satisfactorily solved in some cases, but which requires some further consideration in adaptation of satisfactory regulating mechanism to some special forms of turbine and to some special uses.

The promise would seem at the moment to be the introduction very widely of a new type of prime mover which adapts itself in a peculiarly happy manner to purposes to which the common forms of steam engine are not likely to prove as perfectly satisfactory. The indications are that the supply of power by means of this motor will be made as low as with the best types of reciprocating engine and possibly lower, while its simplicity of plan and ease of construction would seem to insure freedom from liability to either accident or depreciation of value to any important extent for long periods of time. The theory and the practical modification of theory in the design, construction and use of the machine are so well understood and the real so closely approaches the ideal that the engineer may readily see his way toward the solution of any practical problem of design that may be presented, while he also may as readily see a remedy for any observed defect of efficiency or of mechanical action. It should therefore be expected that such approximation to the ideal perfect machine as is possible will soon be attained; particularly as, already, the study of the theory and the observation of the practice of the time with this machine is now being made the task of an immense number of learned men of science, of able practitioners and of skillful constructors. Probably never in the history of engineering was so simple a machine made the object of investigation of so large a number of able men, inventors, constructors, engineers and men of science, and the subject of such extensive experimental research.

It is very possible that, through the development of this ancient device, we may yet see the nearest approximation to ideal thermodynamic and mechanical efficiency in the group of heat motors that man can attain.

The Master Painters on the Labor Question.

A complete report appears in the *Painters' Magazine* for March of the proceedings of the Master House Painters and Decorators of the United States and Canada at their nineteenth annual convention, held in Richmond, Va., February 10 to 13. The convention devoted much time to the consideration of the labor question, a special committee making an elaborate report. The committee appended to their report the following proposed "cures for labor troubles:"

1. Fair dealing on the part of the employer; not taking advantage of a man's necessity.
2. Asserting our rights as American citizens and demanding proper protection in the carrying on of our business from the Government, which can be brought about by a consolidation of the reputable employers in the various branches of the business.
3. A united demand that labor unions shall be responsible for their acts or the damage they unjustly inflict on the employer. Their claim for power is found in their organization and the threat of united political action on their part. The natural cowardice of the men in office, which would be offset by a compact organization on the part of the employers and respectable employees. The lack of union on the part of the employers weakens their case very materially.
4. Putting the stamp of disapproval on the boycott, which is un-American, unjust and would not be tolerated by the intelligent American citizens if they realized it was being enforced.
5. Demanding that a better show should be given to the American youth in their desire to learn a trade. In other words—care for the coming man. As American citizens and employers, recognize our responsibility as educators in enlightening the minds of the conservative element in our employ, opening an avenue for mutual understanding, agreement or arbitration between them

and us, impressing on the minds of our customers that we have some rights that should be protected by them if an unjust and unfair demand is made upon us.

Last. Try to conduct our business along the line of the Golden Rule, eliminating selfishness as a controlling power.

The following preamble and resolutions were unanimously adopted by the association as a result of the discussion of the report:

Whereas, The labor unions of our country, under their present management, are not pursuing a course that is advantageous to any clear minded employer, nor any conscientious skilled employee. The endeavor on the part of the leaders to control the management, to curtail the output of the business and place all workmen in the same grade has a tendency to take the spirit and destroy the ambition that should be the animating force, so that the best results could be attained by the employee himself; and also that the line pursued by the leaders to bring about results by intimidation, threats, boycott and other un-American methods that aim directly at the destruction of the freedom of individual choice, and robbing of the individual of his rights granted to him by the Constitution of our country; and,

Whereas, The trend of the times is to consolidation, both on the part of capital and labor, we as employers recognize the right of labor to organize, and we believe no fair minded employers have any unkind feelings toward their employees if they exercise the right to lawfully combine, for the purpose of bettering their conditions. And we believe every patriotic American citizen, whether he be employer or employee, recognizes the constitutional right that secures the blessings of liberty to ourselves and posterity which can only come to us by recognizing and respecting, on the part of each individual, the rights of his neighbor, and we feel that in the development of these combinations injustice is done often unintentionally, and we desire, as employers and lawful American citizens, to put ourselves on record and to do all that we can to bring about cordial relations between our employees and ourselves; therefore, be it

Resolved, That we, the National Association of Master Painters and Decorators express our unanimous opinion that the several States should exercise the power conferred by the Constitution in passing such laws as will require labor unions to organize as corporate bodies under the law, in such manner as will make them responsible for any damage, for any wrongful, malicious and unlawful acts committed by them or their agents and representatives, even as the employers are to-day responsible; that the rights of the individual to dispose of his labor should be free, except as far as peaceable and lawful moral suasion is concerned. That the workman should be protected in his rights to gain his living, even if he refuses to be bound by the laws of the labor unions.

Resolved, That the attitude taken by the labor unions in the matter of curtailing the number of apprentices to be employed by their various trades is damaging to the coming men of the nation, as well as placing us in a state of dependence upon the skilled labor from foreign lands, and that we deem it a wrong to the boys and a menace to the further progress of our nation, and we demand that the powers of the Government be exercised to protect the young men of our country in their endeavors to learn a trade.

Resolved, That we most heartily condemn as un-American and wrong in principle the boycott, and respectfully call the attention of the American citizen to that most dangerous of all weapons which is now used by the labor leaders to accomplish their ends; since under this Government every man should be allowed the privilege of living without the fear or dread which is now put upon him by irresponsible men and irresponsible organizations; and be it further

Resolved, That we recommend to the State and local associations of Master House Painters and Decorators of the United States and Canada that they do all in their power to promulgate the principles as set forth in the foregoing resolutions, believing as we do that there is nothing therein contained that any self respecting citizen can take exception to.

Lake Iron Ore Matters.

Considerations Affecting Ore Purchases.

DULUTH, MINN., March 21, 1903.—Buying of Mesaba ores has been less rapid than of old range ores since the settlement of price, doubtless on account of the considerable advance made in the rate named on such ores. But there is considerable buying, nevertheless, and mining interests are not at all disappointed at the outlook, expecting that an accelerated movement will take place a little later, as soon as furnacemen become accustomed to the fact that they cannot hereafter obtain their supplies of Mesaba ores at so great a discount as formerly. Old range ores that are on the market have been in much demand and are about all placed for the year. There are some siliceous and non-Bessemer ores from old ranges that have not been called for, but the desirable grades are out of the way. The blowing in of furnaces at Clairton on Mesaba ores exclusively is a matter of considerable interest in this connection, and in consideration of the further fact that desirable old range Bessemer are very scarce. A good many furnace interests and would be iron makers are seriously considering the question of where they are to buy these ores as mixtures, even in smaller percentages than formerly, and they have not been able to satisfy themselves that a continuous supply is to be had. Should some of the recently reported sales of ore holding concerns on old ranges be facts, the amount of these ores for general sale will be still further restricted, and what there is left may be held at higher figures than in the past.

Operations on the Mesaba Range.

On the Mesaba the Cleveland Cliffs Company have let contracts for the stripping of the property in 57-22 they have been exploring this winter. It is a shallow stripping and considerable ore will be mined this year. At the Albany, of Pickands, Mather & Co., they are sinking a shaft and preparing for mining. The same firm have their shaft in their new Troy in ore and are taking out ore steadily. The new Elizabeth is to be a shipper this year, and work on a shaft has commenced at the west end of the range, in township 56, range 23. West of any actual developments a number of drills are at work. These include some for the United States Steel Corporation. This is the furthest west that they have any properties except the Diamond. There are also several for the Cleveland Cliffs, for the Great Northern road, the Standard Mining Company and G. G. Hartley. The Standard drills are on the old Arcturus property, which is under option for lease. This is a little further west than the rest and is over the line in range 24. The work that has been under way all winter in township 59, range 14, on the extreme end of the developed portion of the range, is being closed down. Part of the Longyear drills are through, those of the Cleveland Cliffs and Algoma companies are stopped, and the Boulder and Delta companies, associations or local speculative explorers, are still working. Still further east, in township 60, range 14, on the original Mesaba district, the option of R. Whiteside on the lands of the Mesaba Iron Company is now being fulfilled by drilling operations. Several crews have just located there. This land includes more than 6000 acres running in a north-easterly direction from the southwest corner of 60-13 for about 10 miles into the center of 60-12. This region shows many indications of ore, with much surface showing in places, but the general opinion is that, instead of being a merchantable ore, it is altogether a titaniferous magnetite. The present exploration may prove or disprove this theory, and in consequence it is an important matter. In 59-14 some ore has been shown, but not in any quantity, and the probabilities of that township are decidedly slim. The same may be said of the whole district to the east of the Duluth & Iron Range road's crossing of the Mesaba heights.

The management of the removal of pumps from the Penobscot mine by the Steel Corporation people has been particularly notable. It was a splendid job of work of a character where a mistake would have been fatal and where some accident might easily have taken place, perhaps through no fault of those in charge.

Three of the best master mechanics of the United States Steel Corporation were on hand, each in charge of a shift, and work was continued every hour during the entire time the pumps were coming up. Every part connected therewith was safely taken out and the work continued for some ten days.

On the Marquette Range.

The American Mining Company, now a part of the United States Steel Corporation, have agreed to join with the majority fee interest in the ownership of the Negaunee mine in a lease to the Cleveland Cliffs Company. This was a 7-108ths and was bought by the American Mining Company when that company formed a part of the American Steel & Wire Company, for the express purpose, as is generally supposed, of forcing the Negaunee fee owners to continue the lease to the American Company when the latter's present lease runs out in September, 1903. But an amicable agreement was easily made with the successors to the American Steel & Wire Company. Had there been no such settlement the property would have been sold through the courts and a partition would have been necessary.

Other extensive ore deposits in the Negaunee basin are those of the Breitung estate, in what are known as the Breitung Hematite and Mary Charlotte mines. Both are being rapidly developed. At the former the ore body is being penetrated by two drifts, which, so far, have been run 120 feet from the shaft. A small amount of ore is on surface and shipments of some quantity will be made this year. The Charlotte mine is on what is known as Negaunee as the brick yard 40, and a number of drill holes have cut the formation, showing up the deposit. A three compartment shaft has been sunk 80 feet, with 50 feet more to go to reach the first level, where drifting commences. Lean ore has been cut by this shaft from close to the surface and the better grade expected with greater depth is a soft variety.

At the Fogarty property near Stambaugh, Menominee range, ore has been cut in a new hole and the property will now probably be disposed of to some operating company. It is far enough along to warrant considerable expenditure for shaft work.

All the office force of the Champton Mining Company, at Beacon, Mich., has been transferred to Duluth and the company's offices will hereafter be in this city. The mining interests of W. P. Snyder will be managed from the same office.

A number of lake iron men are on their way to Cuba to carry on operations for large concerns there. Among these is the Spanish-American Copper Company of Santiago de Cuba, to which Captain Cowling and a number of assistants, all from Amasa, will go next week.

D. E. W.

Another American-Mexican Iron and Steel Company.—A New Jersey charter has been granted to the Steel & Iron Corporation of Mexico, with a capital of \$1,000,000 common stock and \$600,000 7 per cent. non-cumulative preferred stock. This company are the successors of the Compañía Industrial Mexicana, who were organized in 1887, and possess a plant at Chihuahua, which was described in *The Iron Age* in November, 1901. It is said that Enrique C. Creel, who was identified with the Mexican Company for some years, will be elected president of the new company. Later on it is intended to issue \$500,000 6 per cent. first mortgage bonds, the proceeds of which are to be used in developing the property and for building a blast furnace. The mortgage is to be a first lien on all the present property and additions, including the blast furnace to be built. H. B. Seeley of 11 Broadway, New York, is interested in financing the new company.

The Railway Club of Pittsburgh will hold its regular monthly meeting in the Hotel Henry, that city, on March 27. A paper will be read by E. W. Summers on "Steel Cars Without Center Sills," a phase of steel car construction which is a radical departure from the method now in use, the paper to embody results of the practical tests of such a car, several of which have been built by Mr. Summers, the inventor. In the afternoon the club will inspect the Pressed Steel Car Company's works

at McKee's Rocks. The club has been organized but little over a year, but already has a membership of over 360.

The Knife Ball Bearing.

The Pressed Steel Mfg. Company of Philadelphia were chartered last year for the special purpose of developing and applying the Knife ball bearings to various kinds of machinery. This bearing is so constructed that it takes either end thrusts or weight, or both. The raceway is pressed from special steel, is hardened and ground, and it and the retainer are inclosed in a soft

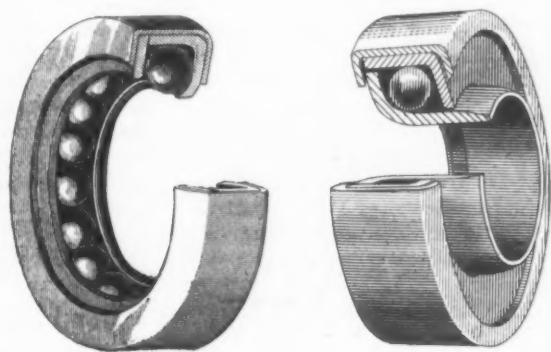


Fig. 1.—Broken View of Bearing. Fig. 2.—Combination Bearing.

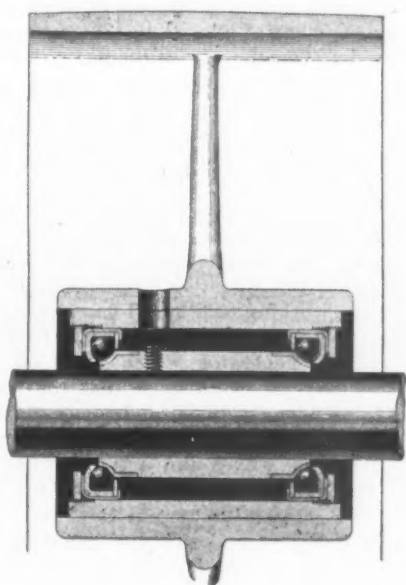


Fig. 3.—Loose Pulley Sleeve.

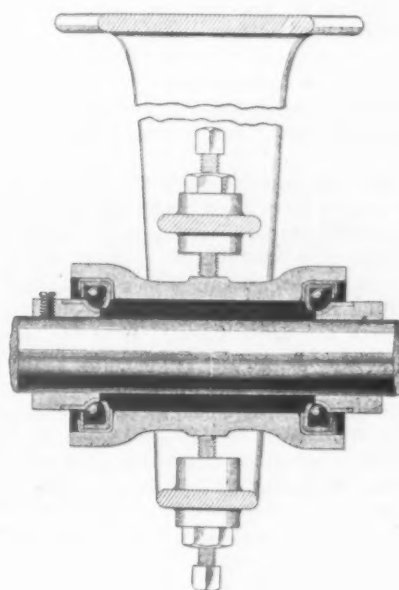


Fig. 4.—Hanger Box.

THE KNIFE BALL BEARING.

metal jacket. Each size bearing is pressed from dies and is therefore uniform in every detail. Pressed steel cones are made for use with these bearings, which are hardened and ground to make a true and lasting track for the balls. The combination ball bearing, Fig. 2, consists of the bearing and cone, and is so constructed that it can be applied without finishing either the spindles or boxes. This pattern is particularly adapted to light work.

The Vulcan Crucible Steel Company.—The new 10-inch mill of the Vulcan Crucible Steel Company, at Aliquippa, Pa., is now in successful operation, and the 12-inch mill, which is now under construction, will be put in commission in about a week. A new 4-ton hammer is being placed and a 10-ton open hearth furnace is being rushed to completion as fast as possible. This furnace is erected in a steel building equipped with a 20-ton electric crane and is up to date in every particular. The

Vulcan Crucible Steel Company have a most modern plant at Aliquippa and are manufacturers of high grade crucible tool steels. They are having a very large demand for their product, and have found it necessary to increase their capacity a number of times in order to meet the large increase in their business.

The Cooley Cycloidal Engine.—The Cooley Cycloidal Engine Company, Allston, Boston, Mass., exhibited their engines to the representatives of the press at their factory on Braintree street, on Wednesday, March 18. The company have taken out many patents in the United States and in foreign countries on the application to mechanics in various ways of the cycloidal movement and principle, with special reference to the manufacture of engines. The company claim that this movement is entirely new to the mechanical world, and that it is applicable not only to the rotary engine field, but to the entire field of mechanical industry. The officers of the company are Charles S. Farquhar, president; William C. Gray, vice-president; George F. Taft, secretary; Edward A. Phibben, treasurer; John F. Cooley, general manager. The factory at Allston is well equipped and the company is capitalized for \$2,000,000. After an inspection of the factory the press representatives assembled in the engineering room and President Farquhar introduced Professor Edward F. Miller of the Massachusetts Institute of Technology, who gave the results of the many tests that he had made of the engines. In his first test of the small type of engine he found that with a pressure of

135 pounds it consumed only 43 pounds of steam. Tests are still being made, and the possibilities of the engines, as to capacity and speed, have not yet been exhausted. President Farquhar then introduced John F. Cooley, the inventor of the engines, who gave a complete exposition of the principles and application of the cycloidal movement. Mr. Cooley said that this movement "bridged all the distance between the circle on the one side and the straight line on the other," that the movement when applied to mechanics would be as completely under the control of the mechanic as any of the old movements, and that there was no doubt of the indefinite application of the movement in many branches of mechanics. He then conducted the representatives through the factory and exhibited the different applications of the movement, as in the marine engine, automobile, machine tools, air compressors and dynamos. At the close of the exhibit the party were given a dinner by the company at the Hotel Bellevue, Boston.

Notes from Great Britain.

The European Outlook and the Metal Market.

LONDON, March 13, 1903.—The European metal market in general, and the British market in particular, are at the present moment in an unusually interesting condition. For the moment the bulls are having it all their own way. It is hardly an exaggeration to say that during the past ten days or so the British market has been almost feverish. It may be well, therefore, to take a bird's eye view of the general European situation, having regard to the fact that the European markets affect British prices almost instantaneously.

I have several times recently commented upon the growing absence of foreign competition. The reasons for the withdrawal of foreign competition may be traced to two separate causes. In the first place, there is still a considerable movement of pig iron and billets to the United States. More important, however, are the indications of a distinct resuscitation of trade in Europe. This is particularly true of Germany. Compared with a year ago the German market is distinctly favorable. A Lorraine mill has secured an order for 10,000 tons of rails for America during the past week—an order originally intended for the British market. The prices obtained are not good, but at the same time they are an improvement on previous prices.

Taking a tolerably conservative view of the general situation throughout Europe, it would seem that the worst has for the present been left behind, and that iron and steel masters and engineers in the principal manufacturing countries of Europe will for the next few months be fairly busy either supplying their own market or sending their surplus to the United States. All this, of course, has a most important bearing upon the English markets. The American demand came when we were depressed and when Germany was even more depressed.

Another cause for hopefulness is that during the past week or two orders have been given out for the home, foreign and colonial markets with greater freedom than for many months past, and reports come to hand of improving business and even rising prices in finished goods. The shipbuilding industry has recently secured a number of contracts for large liners. It is unfortunately quite true that tramps, so far from being built, are at the present moment being laid up owing to existing low rates of freights. In consequence of this the proprietors of the regular liners are taking advantage of the low prices to add to their fleets, and thus even the serious condition of the shipbuilding market is to some extent being mitigated.

Prices.

The week's market activities have shown a general strengthening all round, with one exception. The Midland Gas Strip Manufacturers' Association has sanctioned a reduction of 2 shillings 6 pence. This reduction is not popular, even among members of the association. It is thought a little perilous to do this, in view of the strong market in raw materials. The reason for it is that there is keen competition between Midland and Northern makers of gas strip. It is felt that the reduction will not last long if the market remains in its present condition. Other prices remain as quoted last week with the exception of Scotch and Middlesbrough warrants, both of which advanced. Prices today are quoted:

Pig Iron: Scotch, 56 shillings 3 pence; Middlesbrough, 51 shillings. Forge qualities: Staffordshire cinder, 48 shillings 6 pence; part-mine, 49 to 51 shillings; all-mine, 57 shillings 6 pence to 67 shillings 6 pence; best do., 80 to 85 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 48 to 50 shillings; Derbyshire, 50 to 51 shillings; North Staffordshire, 51 to 52 shillings; Lincolnshire, 53 shillings 1 penny.

Public stores stocks, Thursday, March 12:

Connal's, at Glasgow.....	Tons.
Connal's, at Middlesbrough, hematite.....	19,948
Connal's, at Middlesbrough, hematite.....	1,300

Wednesday, March 11:

Hematite, West Coast.....	22,408
Connal's, at Middlesbrough.....	129,930

Finished Iron: Marked bars, £8 10s.; Earl of Dudley's brand, £9 2s. 6d.; second grade, £7 10s.; common unmarked bars, £6 5s. to £6 10s.; North Staffordshire bars, £6 15s.; angles, £6 10s. to

£7; sheets, singles, £7 12s. 6d. to £7 15s., doubles £7 15s. to £7 17s. 6d., trebles £8 7s. 6d. to £8 10s.; galvanized corrugated sheets, f.o.b. Liverpool, £11 10s. to £11 15s.; hoop iron, £7 5s. to £7 10s.; nail rod and rivet iron, £7 5s. to £7 10s.; gas strip, £6 12s. 6d. to £6 15s.

Steel: Bessemer billets, £4 15s. to £4 17s. 6d.; Siemens billets, £4 17s. 6d. to £5; mild steel bars, £6 12s. 6d. to £7 2s. 6d.; steel plates, £6 5s. to £7; steel girders, £6 to £6 5s.; steel angles, £5 15s. to £5 7s. 6d.

Shipments Last Month to America.

The leading shipments of metals last month from this country to America were as follows:

	Tons.
Scrap iron.....	1,548
Pig iron: London.....	250
Liverpool	7,590
Glasgow	5,383
Newcastle	2,950
Hull	1,100
Middlesbrough	1,165
South Shields.....	1,200
Leth	150
Total.....	19,788

Bars	220
Rods	241
Wire	396
Galvanized sheets.....	113
Steel billets.....	860
Bars	833
Tinned plates or sheets.....	4,342

Copper.

The announcement is made that the Siangen copper fields, which extend on each side of the Swedo-Norwegian boundary, have been sold to an American company for 4,000,000 kroner (\$1,100,000).

A New Transmission of Energy.

There can be no doubt that scientific opinion is deeply interested in what is alleged to be a new and startling discovery by Thomas H. Williams, a member of the Institute of Civil Engineers, by means of which he claims that electric energy may be sent through space without any wire or other connection. This discovery or invention—call it what we will—must not be confused with Marconi's wireless telegraphy, the methods employed and the results obtained being widely different. Mr. Williams states that his patent not yet being complete, he cannot make public more than the bare outline of the invention. The necessary apparatus, which in the working of a model has already given most satisfactory results, includes a high frequency alternating electric generator which gives off the electric power. It may be so adjusted that the waves can be allowed to wander freely through space, or, on the other hand, can be focused in any desired direction. A collector arrests the waves and a transformer turns them into the electromotive force necessary for working the motor. This apparatus may either be stationary or moving, so that it is as useful for operating the machinery of a factory as for driving the wheels of a motor car.

Dividends and Profits.

Hadfield's Steel Foundry Company are this year paying at the rate of 25 per cent., adding £25,000 to the reserve and renewal account, and carrying forward £15,165. Owing to the growth of the company's business, it is proposed to increase the ordinary share capital by a new issue of 50,000 ordinary shares at £1 each, to be offered to the present stockholders at a premium of £1 10s. per share.

I understand that the directors of Charles Cammell & Co. recommend a final dividend of 7½ per cent. for the half year, making 10 per cent. for the year on the ordinary shares.

Lead and Spelter.

The advance in the price of both lead and spelter has created a good deal of inconvenience on the market. The price of lead has now been raised nearly £2 above the worst point touched last year, although it stands still over £5 below the high water mark level reached in 1900. The conditions of the market are practically the reverse of last year, when the glut of supplies caused the price to be abnormally depressed. Large inquiries from consumers are in the market and important speculative orders are booked for delivery. Should the expectations of a good spinning trade be fully realized,

further improvement beyond the price of £12 6s. 3d., paid recently, is likely to be witnessed in the near future.

As regards spelter the supplies actually available in Europe are barely equal to present requirements. The consumption of spelter has experienced a material expansion during the last six months. The ruling price in London has now reached £21 12s. 6d., being the highest seen since June, 1900; but with prospects of an increasing demand and in view of the fact that producers have already contracted for their output several months ahead, it may be reasonably assumed that a further substantial advance is likely to characterize the future course of the market during the next few months, and thus bring the value within measurable distance of the high prices touched three years ago.

The Wages Board and Small Makers.

The annual report of the Midland Iron and Steel Wages Board is interesting reading for all those who concern themselves with maintaining regularity and stability of wages in the trade. The report recalls the fact that a year ago it was stated that wages had remained at 8 shillings 6 pence per ton from December 7, 1901, to February 1, 1902. This rate continued until October last, when an advance to 8 shillings 9 pence took place. This increase was given at the request of the operatives in order to restore the customary relationship of 6 pence more than the North of England.

During the year not a single case from the works has been submitted to the standing committee. Considering that the board regulates the relations with their employers of many thousands of operatives, the absence of any case needing a decision of the standing committee over a period of 12 months is a source of great satisfaction. The Welsh committee has only had before it two cases.

Direct Rolling Process for Copper and Brass.

Publicity has been given to a new process in the manufacture of copper plates, sheets, hoops, bars and bolts. The new process utilizes the heat resulting from the refining operation to carry out the rolling of the metal in the breaking down and drawing on stages, and so doing away with reheating in the heating furnaces at present used for these operations. The cakes, plates or bar ingots are ladled as usual from the refining furnace, but into specially constructed tipping or other detachable molds, which have permanent copper plates for their bottoms, and from which the cakes are speedily tipped or stripped as soon as they are set, and then immediately conveyed to the breaking down rolls, and subsequently, when necessary, to the drawing on rolls where they are also reduced in thickness, and afterward cooled. All the rolling up to this point is accomplished by means of the heat left in the metal from its original molten condition. The rolled plates now are ready, after being sheared, &c., as usual, to be heated in a furnace preparatory to being rolled in the finishing stage, and this latter is the only heating required for rolling it.

The following important advantages are derived: 1. Obviating reheating of the metal to a considerable extent, with resulting economy in fuel, labor and time. 2. Doing away with the thin layers or copper bottoms which are first cast into the molds at present before the cakes are ladled onto them, and also the subsequent remelting of these bottoms. 3. Avoiding the burning or overheating of plates in heating furnaces, also the risk of having to remelt the same in order to be refined afresh. 4. Avoiding the accumulation of grit and dust on the products being heated through being carried over from the fire grate, and so causing expensive chipping and cleaning of the surfaces. 5. Avoiding the great waste by oxidation of the surfaces of the articles by repeated heating and cooling. 6. Doing away with the risk of great waste through having to remelt cakes after they have been ladled, cooled down and reheated (as in the old system), through its being sometimes found that they have lost the "tough pitch" in consequence of the refining furnaces having gone back. 7. Vastly augmenting the yield of the mill through doing away with the enforced idleness of the men and machinery in consequence of waiting for the heating of products in heating furnaces, and also because of the system being far

more continuous. 8. Producing a great improvement in the finish of the work, the surfaces of the sheets, &c., presenting a far cleaner and better appearance.

The methods used in conjunction with this process were patented by T. H. Martin, formerly engineer and manager of the well-known Morfa Copper Works, Swansea.

The Barrow Hematite Steel Company.

The Barrow Hematite Steel Company report a profit on last year's trading of £51,906. They will pay the full dividend on the reduced amount of first and second preference shares, 3 per cent. on the ordinary and a further 1½ per cent. on the second preference shares, in addition to advocating £10,000 to a blast furnace improvement, leaving £2828 to be carried forward.

Tees-Side Iron Works Improvements.

The Britannia iron mills of Dorman, Long & Co., at Middlesbrough, after a close of six months for alterations and improvements, were reopened last week. The alterations were carried out by the firm's engineers after careful study of methods in America and on the Continent, and will bring about a largely increased output at reduced cost. Manual labor is minimized by the new equipment, but the increased production may enable the firm to employ about the same number of men as hitherto.

To Build Turbines.

Richardsons, Westgarth & Co., Limited, have come to an arrangement with the Hon. G. L. Parsons for the manufacture of steam turbines at their works in Middlesbrough. Richardsons, Westgarth & Co., Limited, are famous for their marine machinery, but this is a totally new departure, and will doubtless have far-reaching consequences.

S. G. H.

New England Steel Company.—The New England Steel Company, 176 Federal street, Boston, Mass., recently incorporated, are preparing plans for a new plant, to be erected within 20 miles of Boston, which will have a weekly capacity of 150 tons of open hearth and 20 tons of crucible steel castings. The plant will be equipped with four electric traveling cranes and two 20-ton open hearth furnaces, and will have facilities for making castings up to 40 tons. Eugene Edwards is president.

The yearly wage adjustment conference between the Stove Founders' National Defense Association and the Iron Molders' Union of North America was held in Cincinnati last week. After a three days' session the conference was closed at midnight on March 21 by an agreement that the wage scale of this year should continue for the ensuing year, beginning April 1, without changing. It is stated that the molders had asked for an increase of about 10 per cent. The employers are reported to have made several concessions in shop regulations.

H. Clay Moore, 816 Empire Building, Atlanta, Ga., has been appointed sole agent for the Southeastern part of the United States for the Scaife and We-Fu-Go systems of water softening and purification, manufactured only by William B. Scaife & Sons Company of Pittsburgh, Pa. Mr. Moore has had many years of experience in practical engineering.

H. B. Hirsh, secretary, and H. T. Grantham, chief engineer of the Belmont Iron Works, Philadelphia, were in Chester, Pa., recently looking for a suitable site to locate their plant. Several sites were viewed, but no conclusion was finally reached. The Belmont Iron Works is doing a large business in bridge work and structural iron work.

The Reese-Hammond Fire Brick Company of Bolivar, Pa., have given notice that they will allow an extra day each two weeks to any employee who works without the loss of a day in that time. It means that the employee will be about \$100 better off at the end of each year, if he does not lose any time.

The National Bureau of Standards.

Abstract of First Annual Report.

WASHINGTON, D. C., March 24, 1903.—Director S. W. Stratton of the new National Bureau of Standards has transmitted to the Secretary of the Treasury the first annual report, covering the work of that institution since it was organized by act of Congress. The report is of special interest not only because of the comprehensive review which is presented of the preliminary work performed by the Bureau during the past year, but because of the forecast of its activities hereafter and the outline presented of the development which it is hoped Congress will authorize at a comparatively early date. The discussion of the subject of thermometry in connection with the needs of manufacturers of iron and steel is of special importance to the readers of *The Iron Age*. Concerning the scope of the Bureau's work and the equipment of the new laboratories now under construction, Director Stratton says:

"The work for which the National Bureau of Standards was established includes research and testing in the domain of physics, extending into the field of chemistry on the one hand and of engineering on the other. The union of research and testing in one institution is of supreme importance, the investigations being, of course, primarily designed to carry the work of standardization and testing to the highest possible efficiency. The Physikalisch-Technische Reichsanstalt of Germany is an illustrious example of how much can be accomplished where research and testing are combined in one institution. The laboratory requirements are, therefore, those of a research laboratory plus whatever special facilities may be needed for commercial testing. In addition to the workers themselves, there is then required (1) a suitable place in which to work, (2) an equipment of apparatus, tools and machines, and (3) facilities and appliances for providing the proper conditions for experimental work. Two buildings have been planned, one of which, the mechanical laboratory, is now under construction, and the plans for the other are completed. The latter, which is called the physical laboratory, will provide for that part of the experimental work which ought to be kept free from mechanical and magnetic disturbances, and to this end will contain scarcely any machinery. It will also contain the offices for administration, the library, and a well equipped chemical laboratory. The mechanical laboratory contains the mechanical plant, instrument shop and laboratories for the heavier kinds of experimental work, where considerable power or large currents are required. These two buildings are to be connected by a spacious tunnel, through which air ducts, steam, gas and water pipes and electric circuits are carried from the mechanical to the physical laboratory."

Continuing, Director Stratton describes the new laboratories in detail. The mechanical laboratory is, approximately, 135 feet long by 51 feet wide and is three stories high. It will include a boiler room, a large engine and dynamo room, a room for refrigerating and liquid air plants, a large storage battery room, rooms for the heating and ventilating apparatus, an instrument shop, a wood working shop and several small laboratories for electrical work requiring heavy currents. The physical laboratory is, approximately, 172 feet long and 53 feet wide. It will contain laboratories for testing and investigations in weights and measures, electrical thermometry, &c. The construction and equipment will be carried out upon the most approved scientific lines, and it is believed the Bureau will surpass in efficiency any similar institution in the world. In describing the work accomplished during the past year and that which the Bureau will be prepared to undertake during the coming 12 months, Director Stratton says:

Weights and Measures.

"The work of the past year has involved the verification of a large number of standards of length, mass and capacity for the Government and for chemists, engineers, State and city sealers, manufacturers and merchants. In addition to the work done for the public

considerable attention was given to the improvements of comparators, balances and other apparatus used in the work of this character, the object being to design apparatus which will permit of the work being done with the required accuracy and the maximum speed. This, of course, applies only to the routine comparisons, which have to be made in large quantities for nominal fees.

"Verifications of the highest scientific accuracy will be always more or less laborious and require more time, but even here both labor and time are greatly reduced if the proper equipment is provided. The verification of the weights and measures, including hydrometers, polariscopic apparatus and other appliances, used in everyday transactions is one of fundamental importance to the Government and to the people at large. The rapid development of our industries has resulted in new demands upon the Government, to which it would not have been subjected formerly. There is hardly a field in which competition does not exist, and in consequence the Bureau is called upon to settle questions of standards that would scarcely have arisen a few years ago. Another cause contributing to the increased demands along these lines is the necessity for greater accuracy. What would have been considered sufficiently accurate a few years ago will no longer satisfy engineers, manufacturers, merchants or the public.

"Among the more urgent matters demanding attention are the following:

"The verification and stamping of chemical glassware, such as flasks, burettes and graduates. Large quantities of graduated glassware are used by chemists, who are at present obliged either to test it themselves or purchase German ware, which has been examined and stamped by the German bureau of weights and measures. This causes great inconvenience to our chemists, and, moreover, makes it difficult for American manufacturers to compete with German makers of high grade measuring apparatus, whose product bears an official stamp indicating the accuracy of its graduations. Preliminary plans to meet the demands of chemists and manufacturers have been prepared, and it is expected that by the end of the next fiscal year the Bureau will be in a position to test this ware in small quantities.

"2. The design and construction of a model set of weights and measures that shall be adapted to the needs of State, county and city sealers. The sets of weights and measures furnished to the States in accordance with the acts of 1836 and 1866, while doubtless good enough for the dates of the design, do not meet present requirements. The Bureau is continually called upon by State and city authorities for information as to where suitable sets of standards may be procured, and the preparation of such a model set, together with regulations for their use, are matters that are daily becoming more urgent.

"3. The present chaotic condition of the question of hydrometers is also one demanding immediate attention. Numerous hydrometers for special purposes are in use, none of which are based upon an authoritative table of densities corresponding to the indications of the instrument. In consequence much confusion exists among manufacturers and merchants, and even officers of the Government, as to the meaning of the graduations of these instruments, and the aid of the Bureau is frequently invoked.

Thermometry.

"The work in thermometry has hitherto been confined to the testing of mercurial thermometers within the range from about -20 degrees C. (-4 degrees F.) to about 50 degrees C. (122 degrees F.). Work within this narrow range no longer satisfies the requirements of scientific work or the demands of technical processes. Many of the processes of manufacturers are dependent for their successful operation on an accurate knowledge of the temperature, such, for example, as annealing, hardening, tempering, galvanizing, distillation, smelting, &c., temperatures of hot blast and furnace gases, of furnaces and ovens used in the various industries, such as the manufacture of steel products, glass, porcelain and other ceramic materials, &c. In many operations comparatively slight variations of temperature produce

wide differences in the character of the resulting products. This has led to an increasing demand for thermometers and pyrometers that will register high temperatures. Manufacturers abroad have been quicker to realize the great importance of an accurate knowledge of the temperature in many lines of work, although these questions are now beginning to receive due attention in this country.

"The lack of proper attention to this question is undoubtedly due to the absence of suitable standards of temperature, for the indications of the various pyrometers found on the market yield widely different results and consequently lead to confusion and loss of confidence, and this is, in a great measure, not due to inferiority in construction of American instruments, but is inevitable, as the manufacturers could not obtain uniform standards, so that each maker was compelled to establish his own scale of temperature as best he could with the facilities at hand. The result has been that American manufacturers have been compelled to go abroad for reliable standards which are certified by foreign testing bureaus.

"To meet these requirements specifications have been drawn up, and the necessary apparatus purchased or constructed that will in the near future enable the Bureau to undertake the testing of all kinds of temperature measuring instruments up to about 1500 degrees C. (2700 degree F.).

"The liquefaction of air and other gases on a large scale has opened up a new and important field of research on the properties of matter at extremely low temperatures and occasioned a demand for thermometers whose scale extends considerably below that of the mercury thermometer. The Bureau is preparing to meet these requirements, and will very soon be able to certify such thermometers for temperatures as low as -190 degrees C. (-130 degrees F.).

"Many inquiries have been addressed to the Bureau by various manufacturers with reference to the testing of clinical thermometers, and the necessary preliminary work is now well under way. Many thousands of these thermometers are tested and certified each year by foreign testing bureaus, and the high standard of requirements set by those bureaus has done much toward improving the accuracy and reliability of thermometers of this type.

"A considerable portion of the time during the past year was spent in planning the work to be undertaken and in the design of special apparatus. During the past year a considerable number of resistance standards have been verified for manufacturers, scientific institutions and the Government.

Standards of Electromotive Force.

"Accurate measurements of electromotive force are as fundamental as the accurate measurement of resistance. A number of Clark standard cells, legalized by Congress as the standard of electromotive force in the United States, have been constructed from chemically pure materials obtained from a number of different sources, and also from the same materials subjected to further purification. Although the agreement of the individual cells with each other is within 2 parts in 10,000, a further supply of materials for new cells has been purchased. This material will be analyzed and subjected to further purification in order that the standards of electromotive force may meet every requirement. The main source of the variation of the electromotive force of the Clark cell seems to be due to the differences in one of the ingredients used, and investigations should be directed to ascertain under what conditions this material can be obtained with uniform electromotive properties.

"When the unit of electromotive force was defined by the International Congress the best determinations of the value of the Clark cell in terms of that unit corresponded to the relation of 1 volt = 1000-1434 electromotive force of the Clark standard cell at 15 degrees C. Subsequent work has indicated that the volt thus defined is too small by almost one part in a thousand. A different unit has therefore been adopted by Germany. Moreover, another type of standard cell, the Weston,

has been found to possess some advantages over the Clark cell. A number of these cells have already been set up, and, in view of the possibility of its adoption as the official standard of reference, others are to be constructed and compared with each other and with the Clark standard cells. Although the measurement of electric currents will be based upon standards of resistance and electromotive force, the Bureau should undertake the redetermination of the electrochemical equivalent of silver, upon which the legal definition of the unit is based, since the value adopted is not consistent with the definition of the two other fundamental electrical units—the ohm and the volt.

The Verification of Ammeters and Voltmeters.

"One of the temporary laboratories has been fitted up for the calibration of voltmeters and ammeters, and while the range is at present limited to 150 volts and 50 amperes, apparatus will soon be installed for increasing these ranges to 2000 volts and 1500 amperes. The necessary galvanometers, resistance standards, resistance boxes, regulating rheostats and other accessory apparatus have been provided. A comparative study of the different makes of American instruments will be made after the working standards of the Bureau have been calibrated. Facilities will also be provided for the measurement of ammeter shunts of high carrying capacity. A number of requests for work of this kind have already been made. With facilities for the measurement of high voltages and heavy currents the Bureau will also be prepared for the verification of direct current wattmeters and supply meters, and this work will be undertaken for the public as soon as an adequate force is provided. It is desirable that a portable apparatus be designed which will permit electric light and power companies so disposed to have their switchboards and other apparatus tested in place."

The Bureau makes the following announcement concerning the scope of the work to be undertaken in the immediate future:

"For the present the work of the Bureau will be limited to the comparison of the following standards and measuring instruments, either for commercial or scientific purposes:

"Length Measurements.—Standard bars from 1 to 10 feet, or from 1 dm. to 5 m.; geodetic base bars, bench standards, leveling rods, graduated scales, stage micrometers, engineers' and surveyors' metal tapes from 1 to 300 feet, or from 1 to 100 m.; standard gauges, manufacturers' standard measuring bars and limit gauges.

"Weights.—Weights from 0.01 grain to 50 pounds, or from 0.1 mg. to 20 kg.

"Capacity Measurements.—Capacity measures from 1 fluid ounce to 5 gallons, or from 1 c.cm. to 10 liters; cubic foot bottles; chemical glassware.

"Polariscopic Apparatus.—Scales of polariscopes, quartz control plates, &c.

"Hydrometers.—Alcoholometers, salimeters and saccharometers whose scales correspond to densities between 0.85 and 1.20.

"Thermometers.—The determination of the corrections of mercurial thermometers in the interval from -30 degrees C. (about -25 degrees F.) to 500 degrees C. (about 900 degrees F.), including the verification of clinical thermometers. After July 1, 1903, the Bureau will be in a position to certify thermo-couples and electrical resistance thermometers extending to about 1500 degrees C.

"Photometric Standards.—Hefner lamps and incandescent photometric standards.

"Electrical Resistances.—Verification of resistance standards and determination of temperature coefficients, of the following values: 1, 10, 100, 1000, 10,000, 100,000 ohms; and the decimal subdivisions, 0.1, 0.01, 0.001, 0.0001, 0.00001; resistance boxes, potentiometers, ratio coils, and other resistance apparatus; resistance standards for current measurement; resistance above 0.00001 ohm; current carrying capacity below 1000 amperes; determination of electrical properties of materials, conductivity, temperature coefficients, thermo-electro power.

"Standards of Electromotive Force.—Clark, Weston and other standard cells.

"Direct Current Measuring Apparatus.—Millivoltmeters; voltmeters up to 2000 volts; ammeters up to 1000 amperes; wattmeters up to 500 volts and 500 amperes; energy meters up to 500 volts and 500 amperes.

"Alternating Current Measuring Instruments.—Voltmeters and ammeters; range limited to 100 volts and 200 amperes.

"Condensers.—Measuring capacities and testing insulation.

"Standard Inductances.—Measurements and tests."
W. L. C.

Electric Shop Drive.

An interesting discussion of electric shop drive was introduced by a paper by W. A. Layman before the Engineers' Club of St. Louis, and published in the *Journal of the Association of Engineering Societies* for January. The subject was introduced by a description of various methods of electric shop drive.

When electric shop drive was first advocated, the main advantage claimed was a large increase in efficiency over the old methods of belt and rope transmission. Of late, however, another, and, in my opinion, a greater

ed by a single motor. By such arrangement the efficiency of shop drive is increased, roughly speaking, from 25 to 50 per cent. There is a further advantage over belt transmission from a single engine in ability to operate any single group of tools entirely independent of the balance of the equipment. Independence of departments is fully secured by this means. A given group of tools may be completely shut down when not required, and a large loss of energy otherwise unavoidable cut off. This form of drive also permits of operation of any particular group of tools at night, with the main power plant shut down, providing auxiliary central station connection is possible. The factory of the Wagner Electric Mfg. Company of this city is one of a number of local examples of group electric drive. By means of reserve connection with outside central station service it is possible to run any special group of tools overtime, or all night, without operating the company's isolated generating plant.

Engineers agree, however, that the individual motor system is the ideal one where variable speed service of tools is necessary or desirable. In the group system variable speed is impossible, and the individual tools must be regulated for speed variation through inherent gear or cone adjustment.

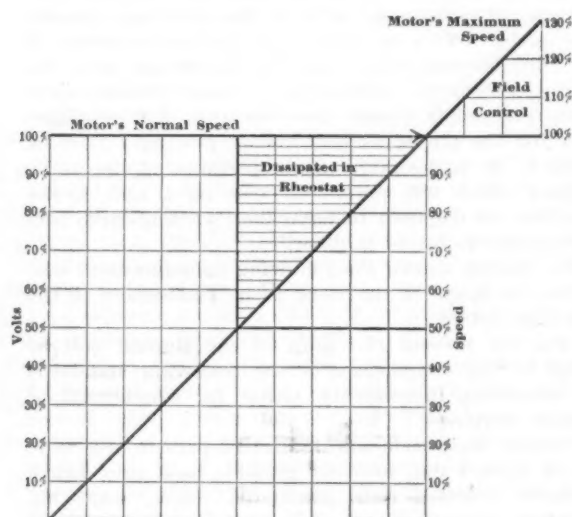


Fig. 1.—Rheostat Control.

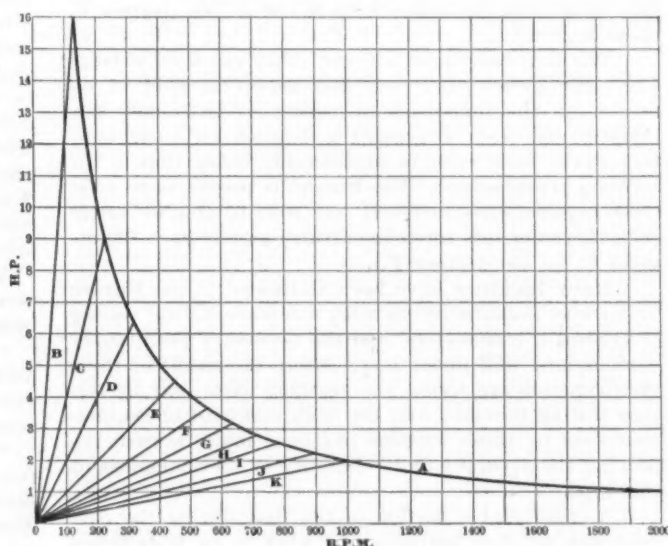


Fig. 2.—Curve "A."—Variation of Shunt Motor Capacity with Change of Speed Secured by Variation of Shunt Resistance.

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advantage appears in the opportunity for increased shop output, resulting from the ability to operate the individual electrically driven tool continuously at its maximum output. Shop managers are to-day keenly alive to the fact that, by means of electric drive, the output of individual tools may be easily doubled and sometimes trebled over that possible with the ordinary belt drive. It is fair to say that the discussion of electric shop drive is no longer one of merit, as compared with the old methods of transmission, but rather one of relative merit of the various electrical methods proposed.

It is claimed on the score of efficiency alone that the best electric methods of to-day show an efficiency of 70 per cent., as compared with 20 and 25 per cent. by the old systems. Adding to this the possibility of double or treble output, the greater advantage of electric shop drive is such as to mean its rapid adoption of all branches of manufacturing.

Group and Individual Drives.

Electric drive may be roughly classified under two headings—group and individual tool system. The former may be termed a compromise between the old and the best of the new.

In its best adaptations group drive is so arranged as to have various classes of machine tools subdivided into groups of from six to ten tools, each group being operat-

Both group and individual drive systems may be arranged for either direct or alternating current motors. For all constant speed service the alternating current motor stands on an equal footing with the direct current motor. In fact, by reason of its greater flexibility and inexpensive maintenance, the alternating current motor for such work has a material advantage. The disadvantage of the alternating current motor appears for all service requiring frequent starting and stopping and wide speed variation. No entirely satisfactory system has yet been evolved by which speed variation comparable to that possible with the direct current motor can be secured.

The ideal alternating drive would be one having constant speed alternating current motor, equipped with auxiliary mechanical device, where necessary, by which wide range of speed variation could be secured smoothly and simply. Mechanical engineers are working on this problem, and such a system may come. I have seen one striking example of it in the shops of the Lodge & Shipley Machine Tool Company, at Cincinnati. The company have evolved a system of intermediate gears neatly inclosed in dust proof case, which they call a speed variator. The driving shaft of this speed variator is direct coupled or belted to the constant speed motor, and by means of a shifting handle, much like the ordinary belt shifter, the gear combinations of the variator are

successively changed without stopping the tool, and with no greater effort on the part of the attendant than would be called upon for manipulating the regulator handle of a direct current motor controller. This device has not come into general use, although a large portion of the machine tools in the Lodge & Shipley factory are operated through it, with results said to be reasonably satisfactory to that company.

With alternating current motor drive, shop lighting from the same mains feeding the motors is possible and convenient, while with the prevailing methods for variable speed direct current motor drive the shop lighting system is practically entirely independent of the motor service system.

The individual drive system may be generally classified under three headings:

Rheostatic control systems.

Multivoltage control.

Special systems for special tools.

Rheostat Control.

In the rheostatic control system the motor is of the well-known shunt type, supplied from a constant potential system of distribution. Speed variation above the normal speed of the motor is secured by the introduction of resistance into the motor shunt field circuit; speed variation below normal is secured by the introduction

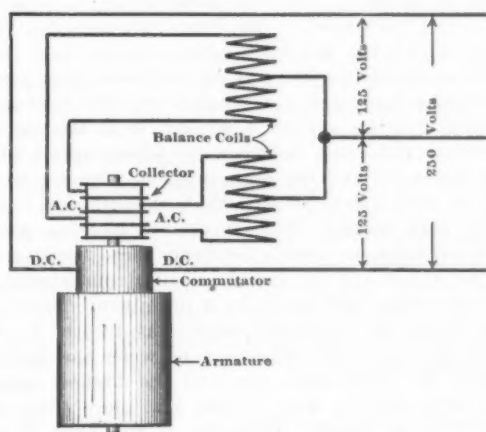


Fig. 3.—Westinghouse Three-Wire System for Variable Speed Control.

Multiple Voltage System.

There are several of these systems. The Westinghouse and General Electric companies advocate a three-wire system, as illustrated in Fig. 3. Their usual direct current generator is provided with a set of collector rings, these collector rings being connected to the armature winding in such a way as to establish an exact two-phase relation between the potentials of the two pairs of collector rings. By means of choking coils, connected as shown, the neutral wire of the three-wire system is exactly and constantly maintained, irrespective of load, at zero potential relative to the outside wires.

In connection with this three-wire system the individual tool is equipped with a standard 250-volt shunt motor, and speed variation is secured in two ways: First, by running the armature either on 250 volts (normal speed condition), or by running it on 125 volts (half normal speed condition). For any speed desired between normal and half normal, shunt field resistance is introduced. If I understand the system correctly, the shunt motor is capable of 100 per cent. speed variation by variation of shunt resistance when the armature is on half voltage (and correspondingly at half load). If speed above normal full speed is required shunt resistance is again introduced.

The Bullock Electric Mfg. Company advocate a sys-

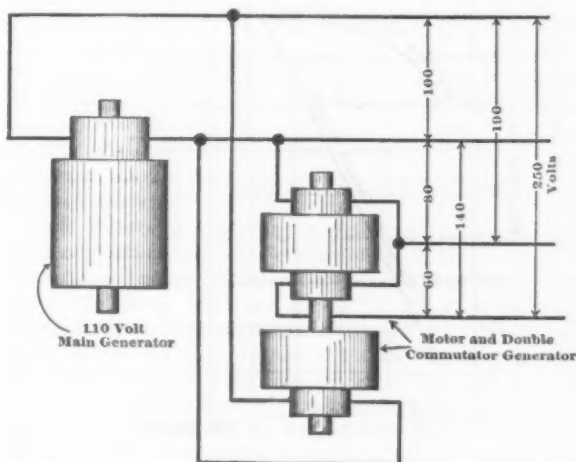


Fig. 4.—Bullock Electric Mfg. Company's Multiple Voltage System.

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of resistance into the armature circuit. This is illustrated in diagrammatic form in Fig. 1.

The disadvantages of the system are its inefficiency when armature resistance is made use of for speed reduction, and variation of speed on a given armature resistance with variation of load. To overcome both disadvantages motors have been designed capable of very wide variation in speed by variation of field resistance. A well-known motor designer stated in a recent discussion before the American Institute of Electrical Engineers that he had designed and built a motor capable of speed variation of one to three (simultaneous load variation not stated) on variation of field resistance alone. In the same discussion an equally well-known motor designer claimed the normal motor was not capable of over 30 per cent. increase in speed, under full load, by field resistance variation.

I think general practice is to confine speed variation by weakening shunt field to 30 per cent., and any motor capable of greater variation can hardly be termed a standard motor. The limit of such variation is determined by commutator sparking. A motor of given capacity may be operated, of course, at much reduced capacity for speed variation of ten to one. The reduction of capacity, with increase of speed, in this case, is illustrated in curve A of Fig. 2. This curve fairly represents the variation in one of the best known makes of direct current motors. For example, a 10 horse-power motor operating normally at a speed of 200 will have an output of 1 horse-power only at a speed of 2000, speed variation being secured entirely by weakening of the shunt field.

tem as illustrated in Fig. 4. A generator, standard in every respect, is supplemented by a small motor generator set, the design of which is such that a four-wire system of distribution is established, providing for six different voltages upon which the motor armature may be operated without the use of armature resistance. The form of motor used is the standard shunt wound type. Without the use of field resistance six speeds may be secured, corresponding in ratio to the ratio of the voltages supplied by the four-wire distribution system. By means of shunt resistance any speed intermediate to that possible with the several armature voltages may be secured. The motor generator set is so proportioned as to take care of the unbalanced load. This system is also adaptable to three-wire distribution, where less speed variation is required, and in the event of three-wire distribution an increased amount of field regulation is introduced. This three-wire distribution differs from the Westinghouse and General Electric systems in that the voltages on the two sides of the intermediate wire differ, thus giving three distinct pressures instead of two. The Bullock system represents the multiple voltage idea carried to its fullest development, and is the extreme of present commercial systems, from the ordinary rheostatic control system. The difference between these systems, from the standpoint of efficiency, is illustrated in Fig. 5 as plotted from the test results on a 25 horse-power motor. I am informed that a system somewhat similar to this is being advocated by the Crocker-Wheeler Company, although I am not prepared to discuss it in detail.

Another form of variable speed equipment is advocated by the C. & C. Company of New York City. In this case the motor is special, being provided with two entirely independent armature windings. On normal speed operation the two armature windings are connected in parallel, the field winding being in shunt. For half speed the two windings are connected in series; intermediate and excess speeds are secured by a combination of armature and field resistances.

For some kinds of service the storage battery has been introduced with good results, various pressures being applied to the motor armature from the battery according to the speed required. The objection to the storage battery system is its large first cost.

For printing press work several special systems have been introduced, the purpose of which is to afford a wide variation of operating speed. I will not attempt to go into a description of these systems, as they are not intended for general shop service in any sense of the word.

Discussion.

W. Cooper: The prime condition to be fulfilled in operating machine shop tools is to keep the cutting speed at the maximum at all times. This maximum speed is limited, of course, by the quality of the cutting tool, the

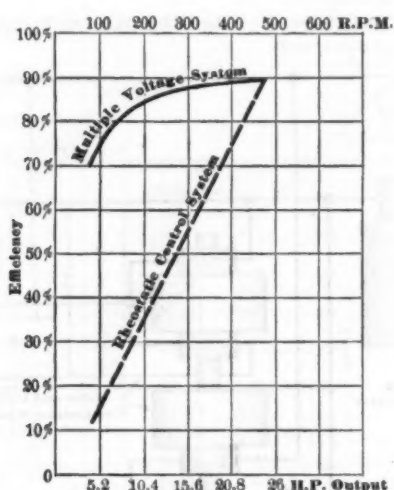


Fig. 5.—Efficiency Curves of Multiple Voltage and Rheostat Control System.

ELECTRIC SHOP DRIVE.

kind of material being cut and whether or not any extraneous means are employed to keep the tool from heating.

Nearly all ordinary machine shop work may be classified under two heads—machining of cylindrical surfaces and plain surfaces. In considering the first class of operations, the piece being operated upon is usually rotated, and, as a very small proportion of this work has but one diameter on each piece, there must, of necessity, be provided some way of changing the speed of rotation in order to keep the cutting speed at the maximum. This condition is arrived at in ordinary machine shop practice on this class of work by using certain arrangements of change gears and by belts on so-called cone pulleys. While it is entirely possible to get a change in this manner of 10 per cent. per step, the complication resulting from the mass of gears and multiplication of steps on the cone pulleys would not be permissible, to say nothing of the time lost in making the changes. As the result of years of practice, this system has developed into an arrangement where the changes are approximately 50 per cent. apart; that is to say, that each increment of increase would be 50 per cent., often being as much as 100 per cent. It is obvious that such an arrangement must be very wasteful of time where the diameter of the piece to be machined is slightly in excess of the nearest combination which would give the maximum cutting speed. The machine, therefore, must be run at slightly more than one-half or two-thirds of

the maximum permissible cutting speed, consuming, consequently, nearly 50 to 100 per cent. more time for a given operation than would otherwise be required.

F. O. Blackwell of the General Electric Company, in a paper read before the American Institute of Electrical Engineers, said: "The reduction effected by different sets of back gears on machine tools will be found to vary from 4 to 1 to 6 to 1. All tools can be arranged with 4 to 1 changes between back gears without any difficulty. In many cases a single back gear is sufficient for a tool. By putting a magnetic clutch on this back gear and making the electrical connections in the controller, it is possible to get a 6 to 1 variation electrically and without increasing the cost of the motor more than would be required for a 4 to 1 variation."

This is quite different from a statement made by Chas. Day in a discussion which followed the reading of Mr. Blackwell's paper. He said: "When attaching motors to old tools, such as lathes and drill presses, we must, as far as possible, adapt our speed range to the present gear ratios, in some cases by introducing additional gears, and in others without change to the machine. We have found that the gear ratios vary from 3 to 1 up to 15 to 1, depending on the size and character of the machine."

From the above we see that there is some difference in opinion as regards the range of the back gears of ordinary machine tools. As a matter of fact, the back gear ratio of ordinary machine tools varies from 3 to 1 up to 15 to 1, as stated by Mr. Day. There is also another fact which has not been touched upon, and that is that the range of speeds given by the cones on a great many machine tools are not consistent with the ratio of the back gearing. That is to say, it is frequently found that the difference between the lowest speed with the back gears out and the highest speed with the back gears in is very much greater than the difference between two cone speeds. Some machines have as much as 3 to 1 variation in speeds between these two conditions. The writer has in mind a case of a comparatively small sized boring mill made by a prominent manufacturer, in which the back gear ratio was $12\frac{1}{2}$ to 1. In this particular case the difference between the lowest speed with the back gears out and the highest speed with the back gears in was a great deal more than the difference in cone speeds. However, in this case, if we were to allow that the best possible arrangement had been made, the average difference between speeds throughout the entire range of the machine would be about 1.9 to 1, the machine being equipped with a four-step cone. It seems incredible that a manufacturer would put such a tool upon the market.

A letter from E. H. Symington was read before the Central Railway Club at their meeting at Buffalo, November 14.

Mr. Symington, in speaking of electric drive in general, recommended, very strongly, alternating current. In speaking of variable speed motors, he said: "With the advent of perfected speed changing devices there is less necessity for having speed flexibility in the motor itself. However, where there are a quantity of traveling cranes and other variable speed apparatus it is well to consider the advisability of a small direct current generating set for this purpose only."

We are still waiting for the advent of the perfected speed changing device. However, we must admit that we cannot practically get a speed variation from an electric motor that will cover the entire working range of the average machine shop tool. There are, however, some tools in which this can be done; for instance, planers, slotters and machines of this character where the cutting speed of the tool is in constant relation to the work, regardless of its dimensions, and speed variation is only required for differences in material. However, in that great class of tools in which the piece being operated upon is of circular form and the relative speed varies directly with the diameter, a very wide range of rotating speeds are required. In this class of machinery it is practically impossible to cover the entire range by varying the speed of the driving motor. Speed control is obtained in nearly every case by a combination of me-

chanical and electrical means, the motor range and gear ratios depending upon the machine and the average variation in diameters and kind of material handled.

We have in any given case a certain total range to cover in any given machine. Let us take, for example, a 48-inch engine lathe. Practice has shown that, even with the best tool steels at present obtainable, it is desirable and almost necessary to have a cutting speed as slow as 16 feet per minute. This, of course, determines one limit of the speed range and is absolutely fixed, while the other limit of maximum speed at which the machine is to operate is not fixed and is determined for each particular case by the probable minimum diameter to be machined. If 2 inches be assumed as the smallest diameter and a maximum cutting speed of 100 feet per minute, at this diameter the maximum revolutions will therefore be approximately 150 times the minimum. This, therefore, is the total range of speed to be covered by the driving mechanism.

The question that next presents itself, and the one that cannot be determined by any hard and fast rule, is, What portion of this range will be covered by the variations of the speed of the motor, if a motor be used, or what other equivalent system will give equally as good results? The case cited in regard to the boring mill is almost exactly the same as the one under consideration. As stated, the builder solved the problem by using cone pulleys and one set of gears. It must be admitted, however, that this solution was very crude. On the other hand, the question is, How many different speeds should be provided within this range and how will they be obtained? As stated, it is impracticable and well nigh impossible to cover this range entirely by varying the speed of the driving motor.

The next step, consequently, is to use one set of back gears. This will call for back gears to be approximately $12\frac{1}{2}$ to 1 ratio; therefore, the limit of speed variation on the motor will be $12\frac{1}{2}$ to 1. The next combination available is to use two sets of back gears, which shall have equal ratios and shall gear into each other. In this case the variation of the motor speed will be as the cube root of the total variation, or approximately as 5.5 to 1.

L. R. Pomeroy of the General Electric Company, in a paper read before the Central Railway Club in Buffalo, November 14 last, quoted a celebrated authority, without naming the authority, as follows: "Where we have to decide whether we shall install one large motor or a number of small ones, I would give preference to the small motors down to a limit of 5 horse-power for light machines and 10 horse-power for heavy machines, this for cases in which the problem is one of distribution only. Where the introduction of motors could have any effect on the product, I would dismiss entirely the question of power and decide solely with regard to the convenience of operation afforded, and would not hesitate to put in the very smallest motors, mounted upon any kind of machinery, notwithstanding their greater cost and lower efficiency, if they even do but a slight degree increase the product of the labor of the shop. Gains in this direction cause other gains to sink into significance."

Another question that usually follows is: "But the tools in this shop are not designed to stand the higher speeds that the modern tool steels will permit; therefore, it is not possible to work them up to the maximum." A reply to this is that if the machines will not stand the strains brought about by the high cutting speed of the modern tool steel, they still have their maximum, and there is just as good reason for working these tools to a maximum as any other tool to its maximum, although the maximum of these tools may be determined by a different factor.

Thus it is seen that there are two good reasons (and there are many more) for equipping machine shop tools with electric drive—namely, the ability to at all times run the tool at its maximum cutting speed; secondly, ability to supply the necessary pulling power. Among the other numerous advantages in equipping machine shop tools with electric drive might be mentioned the ability of placing machines in any position at will, making them, as it were, portable machines; absence of

belts from the shop with their accompanying obstruction to light and accumulation of dirt.

Points on Selection of Motors.—In equipping machine shop tools with electric drive there are many points to be considered in the selection of suitable motors. The first consideration, which directly affects the cost of the installation, is the highest permissible speed at which the motor can be operated.

After determining this point the next point is the range through which the motor is expected to work, and after determining the range through which the motor is to operate the next question is the determination of the method of obtaining this range of speed. A method of driving by electric motor which will use the smallest motor is to use a constant speed motor and get all the changes of speed by mechanical means. If it is desired to get different speeds by varying the speed of the motor when using so-called variable speed motor, there are two methods which practice has shown to be good. The method which first presents itself is varying the field strength of the motor. This is a very simple and effective way, but it is accompanied by the disadvantage of requiring a larger motor than would be required if the constant speed motor were used. For instance, if a speed range of 2 to 1 is required, and the motor is run from a source of constant potential, the motor would require to be four times as large as if it ran at the constant maximum speed. In other words, a motor that will give 1 horse-power at 2000 revolutions per minute maximum, and would also be capable of running at 1000 revolutions per minute on a full field, would give 2 horse-power at 1000 revolutions per minute. This motor would, of course, if run at full strength at 2000 revolutions per minute give 4 horse-power and so on for any increased variation.

Mr. Pomeroy says that a motor with 100 per cent. field regulation, giving a speed range of 2 to 1, costs but little more than a standard constant speed motor to do the same work. As a matter of fact this motor is four times as large as a constant speed motor to do the same work at the maximum speed. Furthermore, this motor, with 100 per cent. field regulation, if supplied with different voltages across its armature terminals, can be made to give another 100 per cent. speed variation by voltage regulation, thereby yielding a total speed variation of 4 to 1. Mr. Pomeroy says the speed variation of 2 to 1 is liberal, but if the same motor can be made to give, without additional cost, speed variation of 4 to 1, there would seem to be no reason why it should not be done, and it would be more than liberal.

If it is desired to have a motor that will give a speed variation of 4 to 1 by shunt field resistance, the motor would have to be 16 times as large as a constant motor to do the same work at maximum speed. Thus it is seen that the limitation of shunt field control is soon reached. However, a combination of shunt field control and multi-voltage circuits gives an arrangement by which a comparatively wide range of speeds can be obtained without the motors being of excessive size. This may be readily understood by referring to curve sheet attached. Curve "A" represents change in horse-power of any motor when running on a weakened field. This might be called a diminution of horse-power curve. For instance, on the curve we see that a motor that will give 5 horse-power at 400 revolutions per minute gives 1 horse-power at 2000. From this curve we can determine the minimum size motor that will be required for any given case, using either shunt field regulation entirely or combining shunt field regulation and multivoltage. Suppose, for instance, that a given machine tool requires 1 horse-power to operate it under all varying conditions of service. It might be stated right here that this is true of a very large class of machines which operate on cylindrical work, barring a slight change in friction load (through the different speeds of the machine; the cutting speed remaining constant the horse-power remains constant). If, as above, a given tool requires 1 horse-power under all conditions of operation, and it is required to have a speed range of 4 to 1, we can get this in two ways, one by using entire field regulation, which will require a motor 4 horse-power at 500 revolutions per minute, or a motor can be used if two voltages, one of which is

double the other voltage, are available. This motor will be required to be 2 horse-power at 1000 revolutions per minute. The horse-power of this motor, due to reduction in speed, by reduction in voltage will decrease along line "K," so that at 500 revolutions per minute it will give 1 horse-power and also give 1 horse-power at 2000 revolutions per minute. It is seen from the curve that with two voltages, one of which is double the other, the range of speed of 4 to 1 is the maximum that can be obtained from a motor which will be worked to its full capacity at both the minimum and maximum speeds. If any greater range than this is required, under these conditions, a larger motor must be used. For instance, suppose that a speed range of 5 to 1 is required and the variation obtainable by changing voltages is only 2 to 1. Assume, as before, that the maximum speed is 2000 revolutions per minute, the minimum speed will be 400 revolutions per minute. Now, as 400 and 800 will be the speed variation by change in voltages a motor will be required that will develop $2\frac{1}{2}$ horse-power at 800 revolutions per minute, or, in other words, where the curve "A" crosses the ordinate of 800 revolutions per minute. The horse-power of this motor will decrease, as all other motors, directly in proportion to its speed by reduction in voltage, and will therefore be $1\frac{1}{4}$ horse-power at 400 revolutions per minute, being in this case slightly in excess of the power at the slowest speed. The motor, however, in this case would be the equivalent of a 3.1 horse-power at 1000 revolutions per minute, or more than 50 per cent. larger than a motor to do the same work with a speed range of 4 to 1.

Assume that a speed range of 10 to 1 is required, with, as before, 1 horse-power at all speeds. The motor which would fulfill the conditions of being worked to its full capacity at the minimum and the maximum speeds would be the motor whose horse-power would be represented by the line "G." This motor would have as maximum rating 3.2 horse-power at 640 revolutions per minute, or a range of speeds by voltages 3.2 to 1, so that the range of voltages must bear this ratio. A motor that will give this speed variation by shunt field regulation entirely would be 10 horse-power at 200 revolutions per minute. This motor would give 32 horse-power at 640 revolutions per minute, or would be ten times as large as a motor giving the same range operating on combined system of multivoltage circuits and shunt field regulation. Thus it would seem that shunt field regulation is prohibitive for any such speed range as 10 to 1.

Use of Curve.—In explanation of this curve it might be said that the line representing the change of horse-power due to change in speed is not directly according to change in voltage, but change in revolutions per minute, but it varies so little from this that no great error will be introduced in using these curves to represent the range of voltages as well. The curve "A," representing the decrease in horse-power due to change in speed by shunt field regulation, is strictly correct.

In further explanation of use of the curve attached, in any given instance, if the speed range has been determined, as well as the maximum and minimum speeds, the full speed full voltage rating of the motor can be ascertained from the curve as follows: Locate on the curve "A" the point corresponding to the maximum speed at which it is desired to operate. Trace to the left from this point on the scale of ordinates and read the horse-power. This horse-power may not be the actual horse-power in any given case, but it can be assumed as proportional to the actual horse-power required.

Again trace from the minimum speed at which it is desired to operate vertically until the horizontal line which represents the same horse-power that was determined from the curve "A" is reached. Through this point draw a straight line from the origin "O," intersecting the curve "A." From the point of intersection trace downward to the base line, and the full voltage full speed of the motor will be found. Now the ratio between the minimum speed and this speed which is found, which is full voltage full speed of the motor, will be the ratio of the voltages which will give the minimum size motor for the given work.

To illustrate, let us assume that it is desired to oper-

ate the motors at a minimum speed of 350 revolutions per minute to a maximum of 2100 revolutions per minute. We have, therefore, rating of approximately 1 horse-power from the curve "A." Tracing vertically from 350 revolutions per minute to the line which corresponds to 1 horse-power, and drawing a straight line from the origin through this point until it intersects with the curve "A," we find that the full voltage full speed of the motor should be 825 revolutions per minute. Now it is not feasible to make motors for all kinds of speeds, so, in selecting a motor for this case, we should choose 900 revolutions per minute.

The ratio between 350 and 900 is 2.6, approximately. This would, therefore, be the ratio of the voltage (maximum and minimum) to be used. The motor, however, will be slightly in excess of the required power at full speed, as would be shown by tracing through point which was reached, corresponding to 900 revolutions per minute, a curve parallel with curve "A." It is at once seen that this motor will be $2\frac{1}{2}$ horse-power at 900 revolutions per minute.

However, assume that it is desired to get this same speed range, the ratio of voltages being 2 to 1. As the minimum speed will be given by the lowest voltage the highest voltage will, of course, give twice that speed, or 700 revolutions per minute. From the curve "A" it is at once seen that the smallest motor that can be used to give 1 horse-power at 2100 revolutions per minute will give 2.8 horse-power at 700 revolutions per minute. This is a point which is found by tracing vertically from base line at 700 revolutions per minute to the curve "A."

Following the line "H" toward the origin until we come to the point that corresponds with 350 revolutions per minute, we see that this motor will give 1.4 horse-power at 350 revolutions per minute, or is in excess of the power required at this speed. In the other case a motor at 900 revolutions per minute had more power than required at the maximum speed. However, the motor operating at 900 revolutions per minute, giving 2.6 horse-power, will be exactly the same motor as the one operating at 825 revolutions per minute, which, as shown by the curve, is the minimum size motor that will fulfill the conditions. The reason why it can be run at 900, giving slight excess of power at maximum speed, is because the range of voltage will permit of it. In comparing the size of the motors required to do given work, one at full voltage full speed of 700 revolutions per minute, the other at full voltage full speed at 900 revolutions per minute, would give 3.6 horse-power at 900 revolutions per minute, as against 2.6 horse-power at 900 revolutions per minute of the motor having the wider range of voltage.

As seen by the curve referred to, the available range of speed for constant horse-power on any given motor is as the square of the ratio of the voltages on which it is operated. That is to say, if a speed range of 9 to 1 is desired the voltages need have a ratio of only 3 to 1. From this it is at once observed that it is unnecessary to use a range of voltages of 4 to 1 for a speed range of $7\frac{1}{2}$ to 1.

F. O. Blackwell, in his paper before the American Institute, said: "It is therefore seen that a motor to be used on the multivoltage system will have to be sufficiently large to carry its maximum horse-power at the minimum potential; or in other words at, say, 40 volts on a 250-volt system, the motor will have to be six times too large when working at its minimum potential." This is, of course, strictly true, and applies equally as well to speed regulation obtained by shunt field resistance, only in a very much magnified degree. While a motor will be six times too large when operating at six times its speed, the speed being increased by an increase in voltage, in order to get the same range by shunt field regulation the motor would require to be 36 times the size it would be if only operating at the one maximum speed. This in itself is sufficient proof of superiority of the system of getting variable speeds by variable voltages over the system of shunt field regulation exclusively.

From this it follows that a motor whose speed is to be varied by change in voltage, field excitation remaining constant, will be directly proportional in size to the

change in speed, while a motor whose speed is to be varied by change of field excitation will be in size as the square of the change in speed.

In conclusion, the writer would indicate a few rules to be used in determining relative sizes of motors for constant horse-power application:

1. The total range of speed, using both variable voltage and field regulation, will be as the square of the range of voltages.

2. Change of horse-power will be directly proportional to change of voltage on armature, field being constant.

3. Change of horse-power by change of field strength will be inversely proportional to change in speed, voltage or armature remaining constant.

4. The relative size of motor as referred to the maximum speed will be directly proportional to its speed variation when using variable voltages.

5. The relative size of motor as referred to the maximum speed will be as the square of the speed variation when using field regulation.

Concentration in the Bituminous Coal Industry.

BY FREDERICK E. SAWARD.

One of the remarkable features of the coal industry in this country is the rapidity with which the bituminous branch has grown; it has doubled in ten years and the end is not yet; to all appearances this will go on and on at a pace that means much for the producers thereof and for the country at large. For the producers it means the development of property that cost but little compared with present day values, and for the country it means the continued supply of a most desirable fuel at a fair rate of cost, for power and other applications. There is a point in connection with all this which means much to the consumer, and one which has not yet attracted the attention that it deserves, the concentration which has been going on in the soft coal producing districts, in view of the continued demand for this fuel. It is of the very greatest importance, since it has a tendency to steady prices. It is not at all a desirable feature to the steam user to have a fluctuating market for this very important item in his cost sheet. With the demand growing and with a number of small producers at the mercy of the carrying companies, so far as charges are concerned, and of labor unions, so far as wages and general cost of running are concerned, the fuel user of the future would be in a bad way indeed. With the trade concentrated so that the tonnage runs up into millions there is the possibility that every order, no matter how large in quantity it may be, receives prompt and desirable attention, and as has been said, at fixed prices. For the coal producer wants steadiness to his trade quite as much as does the manufacturer, and bends every effort in this direction—one price for the entire year.

In this connection of the concentration of interests it is significant how the soft coal producing companies compare with the miners of hard coal. There are a number of hard coal companies in this country whose reports of their business find a way into print, upon every possible occasion, yet there are firms and corporations in the soft coal industry whose tonnage is equally as great or larger, and it is the purpose of this article to make clear this point to the reader. In its most active years the anthracite industry never went above 53,000,000 gross tons of coal shipped to market, and this was for the exceptional year of 1901, after a very considerable idleness during the preceding year. The tonnage so produced was divided in the following proportions:

	Tons, 1900.	Tons, 1901.
Philadelphia & Reading.....	9,338,517	10,500,000
Lehigh Valley.....	6,909,442	8,310,343
Central Railroad of New Jersey.....	5,309,856	7,531,535
Delaware, Lackawanna & Western.....	6,013,849	6,927,852
Delaware & Hudson.....	3,973,859	5,500,000
Pennsylvania Railroad.....	5,169,947	5,007,622
Pennsylvania Coal Company.....	2,090,153	2,500,000
Erle Railroad.....	1,741,069	2,150,000
New York, Ontario & Western.....	1,658,456	2,050,000
Delaware, Susquehanna & Schuylkill....	1,568,488	1,590,862
New York, Susquehanna & Western....	1,333,848	1,500,000
Totals.....	45,107,484	53,568,214

The details for the year 1902 are not yet obtainable, but the sum total was only 31,210,000 tons and each concern did about 60 per cent. of its tonnage for the preceding year. Now let us take up the figures of the soft coal interests, and it will be seen what a power in the land certain concerns are getting to be. Dominating soft coal producing concerns in the United States:

Pittsburgh Coal Company.....	18,000,000*
Steel Corporation companies.....	12,500,000
Rochester & Pittsburgh C. & I. Company..	6,000,000
Monongahela River Con. C. & C. Company	6,000,000
Keystone C. & C. Company.....	6,000,000
Berwind-White C. M. Company.....	5,000,000
Webster Coal & Coke Company.....	3,000,000
Westmoreland Coal Company.....	2,000,000
W. T. Rainey.....	1,500,000
Cambria Steel Company.....	1,500,000
United Coal Company.....	1,500,000
Beech Creek C. & C. Company.....	1,500,000
Total for Pennsylvania.....	64,500,000
Consolidated Coal Company.....	3,000,000*
Chicago, W. & Verm. Coal Company....	1,250,000
Spring Valley Coal Company.....	1,250,000
Total for Illinois.....	5,500,000
Watson Interests.....	9,000,000
Davis Coal & Coke Company.....	1,500,000*
Tierney Interests.....	1,000,000
Total for West Virginia.....	11,500,000
Sunday Creek Coal Company of Ohio....	10,000,000*
J. W. Ellsworth & Co. of Ohio.....	4,000,000*
Tennessee C., I. & R. R. Company of Alabama	5,000,000
Colorado Fuel & Iron Company of Colorado	4,500,000
Central C. & C. Company of Missouri....	6,000,000*
Gould Coal Companies of Missouri.....	2,500,000*
Utah Fuel Company.....	1,500,000
Total for above 25 concerns.....	115,000,000

* Including mines in other States.

This total represents nearly one-half that of the whole bituminous product of the United States.

When these figures of the soft coal producers are compared with those of some of the anthracite shippers it is readily seen how rapidly the bituminous trade is getting away from its old time position. Anthracite will continue to be the domestic fuel for a considerable section of the country, but the vast majority of the industries will take up with soft coal to an ever increasing extent. Any trade which shows growth, as does this particular branch of the fuel industry, warrants the full attention of all engaged in the discussion of economic subjects. Doubtless this comparison will come as a revelation to many; it has never before been presented in the graphic fashion now placed before the reader.

New Publication.

Analyses of Pig Iron. Volume 2. Collected and published by Seymour R. Church, San Francisco, Cal. Pages, 230. Illustrated. Price, \$5.00.

Mr. Church has issued in this work an entirely new edition of his compilation of analyses of pig iron, the first volume having met with such a cordial reception as to justify a continuance of his labors in this field. The preface states that the contents of Volume 2 are in no way a repetition of Volume 1, neither volume being really complete without the other. Volume 2 contains analyses of a very large number of American brands of pig iron as well as numerous English brands and a fair representation of brands made in Scotland, Wales, Belgium, Canada, France and Germany. Illustrations of furnace plants and fractured pig iron are scattered through the book, and portraits of prominent iron men are also given. The contents are further enriched by special articles by Thomas D. West and Albert Ladd Colby. Statistical tables bearing on the pig iron trade are presented.

The \$45,000,000 mortgage on the properties of the Union Steel Company and of the Sharon Steel Company and their underlying and allied companies, was placed on record in Mercer County, Pa., last week. It was the most voluminous and the largest in amount of any mortgage ever filed in the county.

The Iron Age

New York, Thursday, March 26, 1903.

DAVID WILLIAMS COMPANY,	-	-	-	-	-	-	-	-	-	PUBLISHERS.
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The Report of the Anthracite Coal Strike Commission.

The report of the Anthracite Coal Strike Commission, some parts of which we print elsewhere, is important from many points of view to the metal industries, even though they have little direct concern with what is passing in the mining regions. The labor question, in some one of its multitudinous phases, is certain to affect the operations of the vast majority of industrial plants during the next few months, many observers being of the opinion that the attitude and the exactions of labor will cause a check in our present prosperity by making moneyed men timid about embarking in new enterprises or extending existing operations. To the industrial world at large therefore the aim of a study of the report must be to discover its probable bearing on the present general labor situation, which is far from satisfactory now and threatens to become worse.

We may under the circumstances allude only briefly as a matter of little immediate interest in the discussion to the questions raised by the very act of the creation of the Commission, serious though the intervention of the President of the United States may prove in the future as a precedent for an unwarranted and unnecessary exercise of Federal executive power. We may frankly add that the work of the Commission seems to justify the steps taken by the President, and that may, from our point of view, be considered the greatest praise which can be bestowed upon the Commission, aside from that merited by the achievement of making its findings unanimous.

The personnel of the Commission, with its widely divergent sympathies and interests, might easily have led to inconclusive results, embodied in a majority and a minority report. It is quite evident that compromises were effected, and these are reflected in the apparent incongruity between the review of some of the evidence in which the men's contentions are rejected one by one, and the awards based upon it. We cannot escape the impression that the Commission has encountered a condition making it possible to do what Mitchell first proposed to the coal mining presidents that they do—viz., to increase the price of coal and from the enhanced returns thus secured pay the miners the advance in wages demanded. We do not mean to say that the Commission deliberately did this, but the rise in prices caused by the scarcity of anthracite coal furnished the opportunity to grant an advance in wages which, as was brought out in the hearings, the companies were willing to concede at that stage of the struggle.

The men have secured only one-half of what they demanded in the matter of wages, and instead of a reduction of the hours of labor by 20 per cent., have been granted only partial concessions on minor points. They have secured the right to employ a check weighman, and have been accorded a sliding scale which fixes wages for a considerable period to come. They have been denied the demand for a change to a system of

payment by weight. Taking it all in all, the efforts of the union have not resulted in achievements commensurate with the sacrifices made, a fact which should teach a lesson to those labor leaders in other branches who are consumed with a desire to bring about a test of strength in the near future.

The Commission did not recognize the United Mine Workers of America as was demanded by the leaders of the men. This refusal is simply based on the ground that such recognition was not considered to be "within the scope of the jurisdiction conferred upon it by the submission." Yet there runs through the report a tone of admonishment to employers which points in the direction of recognition. The Commission, however, has done splendid service in embodying in the report a fairminded and straightforward general statement of the rights and the responsibilities of trade unions. Some telling truths are effectively emphasized, and the chapter on the lawlessness, boycotting and blacklisting admirably rounds this out. The rights of nonunion labor are defined in unmistakable language. Considering that some of the members of the Commission directly represented organized labor, or were in avowed sympathy with it, these declarations are particularly significant.

The question is whether these truths will find lodgment in the minds of the great mass of the members of trades unions, and whether they will help to shape their course in the near future, while the doctrines of the Commission are still fresh in the minds of all. One cannot help feeling that they must make some impression. But after all, if the effect in that particular quarter does not come up even to moderate expectations, there remains the exceedingly potent influence which the declarations of the Commission must have upon that great mass of citizens of our country not directly affected by labor organizations, who after all, in the end, shape the course of events.

They have been taught that sensational statements as to the condition of labor must be received with reserve, and that often their sympathies are played upon. The principle of majority rule has been so firmly fixed in the minds of our people that they have failed to recognize that a minority of labor cannot be deprived by a vote of certain fundamental rights. The Commission brings this out clearly. They have again been told that the law of the land must reign supreme, and that, however powerful may be either an employers' organization or a labor union, it must keep within the bounds drawn by those laws. It is this educational value upon the general public which cannot be too highly estimated, and which, we believe, constitutes the Commission's greatest claim to the gratitude of the country at large.

The Progress of Financial Reform.

In view of the inaction of the last session of Congress it might seem that the subject could be disposed of by the summary statement that there is no progress in financial reform. But there has been some, and the present situation is not entirely discouraging. The action of Congress on the Philippine coinage has no direct bearing upon remedial legislation for the United States, but it has important indirect bearing. At the first session of the late Congress the Senate killed the proposition of the House to establish the gold standard in the islands. But at the second session the Senate assented to the proposition and it became a law, although in the meanwhile a curious combination of opponents of this measure got temporary control of the House and passed a measure which would, indeed, have established the

gold standard in the islands, but would at the same time have thrown the business of the islands into inextricable confusion by changing the monetary unit and substituting the American dollar for the Mexican dollar, or peso, which is worth less than half as much. That rational action was taken at the second, though defeated at the first, session is an encouraging manifestation of the susceptibility of Congress to the weight of argument and the force of facts, though it takes a good while to produce the desired effect.

Although the bill for an asset currency did not get through, there are many indications of the increasing strength of the proposition. The present Comptroller of the Currency is strongly in favor of it; his predecessor was opposed. Every time the measure is favorably reported to the House it gains something. It received some support last winter which it had lacked before. The idea of an asset currency is becoming familiar in Congress, and is no longer treated as something chimerical or impracticable. A rival of the Fowler bill was introduced from a quarter which had been steadfastly opposed to the whole thing. This bill contained the principle of an asset currency. The fact that it was the short session of Congress made the chances of general legislation poor. The next session of Congress will not only be a long one, but it will be a session of a Congress elected last fall, in the midst of the currency stringency, and when it was more widely recognized than ever before that the evils of an inelastic and insufficient currency were not felt by Wall Street and the speculative world alone, but by the entire business community. More than three-fourths of the reserve cities of the country held less than the statutory amount of reserves last September, and that fact made an impression upon the public mind, West and South, that no amount of argument had succeeded in making, and it would be very singular if the impression were not made upon the men who were elected to Congress in November.

It is not surprising that the Aldrich bill, introduced very late in a short session, did not get through, but it can hardly be denied that public sentiment is more opposed than ever before to the locking up of funds in the Treasury. There is naturally a good deal of difference of opinion about the securities other than Government bonds that might be accepted as security for deposits, or the non-requirement of any security; but there is evidently a growing feeling in Congress that the principle of depositing public funds in the banks, which has been applied for 40 years, might advantageously receive some wider application.

In the discussion of an asset currency there is singularly little attention given to the perfect elasticity it affords in Canada, where the volume of currency rises automatically, and as regularly as the seasons, 15 to 20 per cent. from winter to fall, dropping back 10 or 15 per cent. from fall to winter after the crops are moved, and so effecting an increase year by year and an expansion each year at the time of greatest need. Mr. Fowler's reports use this evidence; the opponents ignore it and treat the proposition as a novelty on which experience sheds no light. But the knowledge of Canadian experience gains something in distribution, and wherever it goes it has some effect. The experience of Canada, also, and of Australia and the various countries of Europe, affords conclusive reasons for branch banking, but the opposition to this comes from Western and Southern jealousy of the Eastern "money power," and the natural unwillingness of Western and Southern bankers to the invasion of their preserves by the agencies of Eastern banks. It will be a long time before these elements

of opposition can be overcome, but it is the West and South which suffer from high money rates, and the effect of branch banking, as shown by the experience in all other commercial countries, is to keep the rates of interest in the remote and agricultural sections down to, or very near, the rates in the monetary centers.

The Expected Depression Again Postponed.

The business situation has undergone an important change. During the fall months the tendency to reaction became quite marked. The reductions in prices of wire products, sheets, tin plates, merchant pipe and bar iron appeared to be the precursors of lower values all along the line. Special influences, mainly the great increase in producing capacity, were operative in the branches of trade in which the reductions had occurred, but as the products affected were staples, the lowering of values caused the development of much bearish sentiment, although consumption showed no signs of diminution. The strength of pig iron and steel billets was felt to be due to special conditions which might be relieved at any time. Improvement in transportation facilities or a prodigious effort to move coke from the ovens to blast furnaces with greater regularity might enable the production of pig iron to be heavily increased, thus making the supply at least equal to the demand and contributing to greater ease in the steel situation. Buyers were therefore disposed to proceed cautiously in making commitments for the future, and in notable instances strong pressure was exerted to induce manufacturers to make concessions in finished products on which prices had been unchanged. A conspicuous effort in this line was the movement by large agricultural implement manufacturers to secure a lower rate on soft steel bars. A period of hesitancy was thus brought about which might have developed general weakness and a seriously declining market if a powerful brake had not been applied to the forces operating in that direction.

The turning point came about the middle of December, when the United States Steel Corporation purchased the Union Steel Company. The importance of this transaction was not fully appreciated at the time. It was, of course, recognized that the corporation had removed formidable competition in certain branches of finished products. The Sharon and Donora works were taking a great deal of business in wire products and were pushing construction on tube works, while entrance into other lines was contemplated. The Sharon Works also comprised a large tin plate plant, but this did not directly compete with the corporation, as their product had been sold to the American Tin Plate Company under a contract to run for five years. Nevertheless, it must have been an indirect competitor, as it was kept in operation when slack trade caused the American Tin Plate Company to close a number of their own plants. The purchase of the Union Steel Company had an immediate effect on the wire trade. Buyers no longer purchased from hand to mouth, but freely anticipated their requirements, appreciating that a great change had occurred and that stability had been imparted to the wire and wire nail market. The improved feeling among buyers enabled an advance in prices to be made easily, and when made it was well received by the trade at large. It is remarkable how quickly a better feeling in such a staple as nails spreads to other lines. The downward tendency in finished products was not only checked, but advances have been made, which were undoubtedly warranted, in tin plates, merchant pipe and bar iron. Some stiffening is even observed in sheets.

The improved tone noted in the finished steel trade happens quite remarkably to be accompanied by better conditions in metals. Copper, lead and spelter are all higher than they were during the closing months of last year. Their values have been strengthened by a totally different set of influences, but general trade conditions are assisted by the upward tendency which is displayed in these lines. Another influence in the direction of encouragement is the cheerful character of reports on fall sown crops. The winter has been very favorable for such crops, and a large yield of winter wheat is now quite confidently expected. Again, exports of American products are increasing, the figures for February showing that all records were broken for that month. And further, the fact must not be overlooked that the European iron trade is recovering from its depression and prices abroad are on the up turn. Thus do combinations of benign influences sometimes unite to promote a better feeling. The most remarkable feature of the present situation, however, is that this is the fourth or fifth time since the dawn of prosperity that a change for the better has occurred when we seemed to be on the down grade. The era of depression has surely been postponed for a season.

Railroad Building in 1903.

The very heavy tonnage of rails sold for delivery during 1903 and the continued active demand for both standard and light sections seem to indicate that even a larger mileage of track will be laid during the current year than during 1902, when, according to recently published statistics, 5684 miles of road were constructed. The most activity in new construction has been in the Southwest, and it is from that section, too, that the most pressing demand now comes.

It is stated by the *Railway Age* that in addition to the track laid in 1902 there were about 2000 miles of line graded, on a portion of which track has been laid since January 1. According to recent estimates there are now under contract 8500 miles, 6000 miles of which are stated to be new track; and over 5000 miles are being built in the interest of 18 companies, indicating that the great railroad systems are the active centers of new construction. The Rock Island, St. Louis & San Francisco and Missouri Pacific are most prominent in this respect, having 450, 755 and 491 miles under construction respectively. The Missouri Pacific, indeed, is also said to have nearly as much additional work planned, and the Wabash has 288 miles under construction or about to be placed under contract for its Eastern extension. The Missouri, Kansas & Texas is estimated to be building 364 miles of new line, most of which is located in Oklahoma and Indian Territory, while the Santa Fé system has 296 miles under contract in Oklahoma, New Mexico and Arizona, with a still larger mileage projected.

For several years the Southwestern States have constructed the largest percentage of new mileage compared with other sections of the country, and at the present time nearly one-half of the mileage under contract is located in that section. The Gulf and Mississippi Valley States come next in point of new construction. In the 11 States included in the Gulf, the Mississippi Valley and the South Atlantic groups 2100 miles are estimated to be under contract. Next to the States and Territories in the Southwest sections the State showing the largest projected mileage is Pennsylvania, where 457 miles are projected, 160 miles of which have been contracted for by the Pennsylvania Railroad Company.

Rise of the Gulf Ports.

If the statistics which emanate from New Orleans are to be relied upon, the Crescent City has attained the position for which she has been striving for years, even though her supremacy as a grain exporting point may be short lived. According to the figures published by the New Orleans Maritime and Merchants' Exchange there were exported from New Orleans during the eight months ending February 28, 1903, over 22,000,000 bushels of grain, while from New York City, the next in order, but little over 17,000,000 bushels were shipped. Baltimore is third in the list with 15,000,000 bushels; Galveston is fourth with nearly 15,000,000 bushels, and Boston and Philadelphia follow with a little over 9,500,000 and 6,500,000 bushels, respectively.

The Trans-Mississippi Commercial Congress has been endeavoring to force this position for several years, and however much the Eastern seaboard may dispute the forging ahead of the Gulf ports in the race for export supremacy, it is evident that events are tending toward diverting foreign shipments of grain to Southern ports. The natural advantages of New Orleans for handling produce raised in the great farming section west of the Mississippi River and also in Illinois—if not some of the other grain States on the eastern banks of the Mississippi—are being recognized more and more; but probably not a little of this is due to the aggressive, if not the coercive, policy of the railroads interested in building up the South and Southwest.

Probably the Crescent City owes much to the congested condition that has prevailed for many months on the so-called trunk lines, especially on roads running from Chicago and St. Louis to the Atlantic Coast. At the present time very little, if any, grain is being billed through from Chicago, and the tonnage on all the lines of general freight is still abnormally heavy. It is claimed that there are fully 5,000,000 bushels of grain stored in Chicago awaiting transportation to the Eastern coast; but cars are still very scarce, it being estimated that the railroads centering at Chicago alone could put into service fully 50,000 more cars than are now at their command. It is stated, too, that many cars that have been borrowed from Canadian roads must be returned within a short period, which does not give an encouraging outlook for increased movement in grain or any other traffic. There can be no doubt that were it not for the Erie Canal and its connections with the great lakes more of the grain passing to the seaboard over the northern route would find exportation through New Orleans.

One would, of course, expect that cotton, the staple *par excellence* of the South, would more naturally find its outlet to European countries from the Gulf ports, and, according to the statistics referred to, nearly 1,500,000 bales were exported through New Orleans and but 100,000 bales less through Galveston during the six months ending February 28. With Savannah, over 3,700,000 bales were exported from the South, while from the Atlantic ports of Baltimore, Boston, New York and Philadelphia less than 550,000 bales were exported during the same period.

It cannot be denied that New Orleans has made wonderful strides during the past few years. It is also well known that she has derived much benefit from the peculiar conditions that have prevailed throughout the country and which have resulted in a large increase of importations of the various commodities, including iron and steel, not a little of which, destined for the Central West, has been imported through the Crescent City.

This showing seems to lend support to the views of those who in forecasting the future of this country have proclaimed New Orleans the coming rival to New York as the greatest seaport of the country. The Gulf of Mexico, it is predicted, is to be another Mediterranean, with conditions prevailing similar to those in existence when the commerce of the world was centered in the sea guarded by the Pillars of Hercules.

Developments on the Mesaba Range.

The number of new mines on the Mesaba range—that is, of mines which will either make their first shipment during the coming season or which sent out small amounts of ore from initial development late in 1902, and will be heavy shippers this summer—is greater than is generally supposed. These mines will contribute no small tonnage to the output of 1903, and will swell the total to be shipped very materially. On the other hand a number of old mines will run under lighter pressure, and some will have the brakes down so tightly as to cease altogether. Mines of this latter character are to be found on every range. It is not expected on the lake that shipments of the year will be as much above a year ago as some seem to figure, although a sufficiently conservative estimate places it at 10 per cent. It is now generally believed, outside of vessel circles, that if it were not for the increased cost of operation of ships lake freights would not advance from last year's figures. The increased vessel room of the season is probably ample to care for the additional tonnage demanding carriage. But nearly all items going to make up cost are higher than a year ago, including fuel, wages and maintenance, and this will have an effect in determining rates.

Last year the following Mesaba range mines were opened, late and made a small product. Some are worked by open pit, some by milling and some underground, and all have been developed during the winter to a point of much greater efficiency. Most of them are owned by independent steel making or selling interests. The rapidity with which these properties have been whirled into the shipping lists is amazing. It could have been done nowhere else than on the Mesaba range:

Name of mine and owner.	Shipment in 1902. Tons.
Agnew, Deering Harvester Company.....	46,000
Crofton, Jos. Sellwood and Drake-Bartow.....	19,000
Glen, United States Steel Corporation.....	24,000
Grant, Jones & Laughlin Steel Company.....	52,000
Hawkins, Deering Harvester Company.....	6,000
Jordan, Corrigan, McKinney & Co.....	148,000
La Belle, La Belle Iron Works.....	71,000
Laura, Corrigan, McKinney & Co.....	16,000
Leetonia, Sellwood and Drake-Bartow.....	29,000
Lincoln, Jones & Laughlin Steel Company.....	88,000
Longyear, Sellwood and Drake-Bartow.....	23,000
Minorca, Buffalo Steel Company.....	35,000
Morrow, Sellwood and Drake-Bartow.....	36,000
Pearce, Sellwood and Drake-Bartow.....	55,000
Pettit, Republic Iron & Steel Company.....	17,000
Utica, Buffalo Steel Company.....	9,000
Wills, Republic Iron & Steel Company.....	12,000

Every one of these properties, it is safe to say, will ship this year from two to ten times its 1902 product, unless there is some sudden catastrophe, now unforeseen. Every one of them is easily able to do all that is expected of it, if cars are available and lower lake dock room is provided.

In addition to the above are many mines on the same range which are now in preparation for the coming year, but have shipped no ore. In this list are the following, all of them sizable deposits of desirable ore. Most of them are owned by independent companies, who have during the past year been extremely urgent in securing Mesaba deposits:

Name of mine and operator.	Location. Sec. T. R.
Albany, Pickands, Mather & Co.....	32 58 20
Cass, Zenith Furnace Company.....	2 58 16
Crosby, Cleveland-Cliffs Iron Company.....	31 57 22
Cypress, Sellwood and Pickands, Mather & Co.....	10 57 21
Elizabeth, Pickands, Mather & Co.....	12 57 21
Higgins, United States Steel Corporation.....	4 58 17
Iroquois, Buffalo & Susquehanna Iron Company.....	10 58 18
Kinney, Republic Iron & Steel Company.....	14 58 19
La Rue, Sellwood and Drake-Bartow.....	29 57 22
Leonard, J. J. Hill Interests.....	28 58 20
Morris, United States Steel Corporation.....	31 58 20
—, Roberts & Wallace.....	19 58 19
St. Clair, Clairton Steel Company.....	23 58 20
Shenango, Shenango Furnace Company.....	22 58 20
Stephens, United States Steel Corporation.....	26 59 15
Susquehanna, Buffalo & Susquehanna Iron Company	6 57 20
Tesora, Fay Exploration Company.....	4 58 17
Troy, Pickands, Mather & Co.....	8 57 17
—, Clairton Steel Company.....	24 57 22
Winnifred, Corrigan, McKinney & Co.....	31 58 20

A few more may be opened during the year, but none others than the above are now announced, and any to come later can be but trifling shippers this season.

A number of the mines named are so advanced that shipments will begin early and continue with moderate activity; some have stock piles of considerable size already on surface. Some are stripping propositions with the surface already cleaned off, and some will be small shippers this season as the mines of the first list were during the previous year.

That such a number of new mines can take their place in a single year upon the range is an evidence of its intense activity in exploration and development and of the magnificent extent of the Mesaba district.

The Independent Labor League.

A charter has been granted by the State of New York to the Independent Labor League of America, an organization seeking to protect the interests of nonunion workmen. The incorporators, who are all residents of Elmira, are as follows: Eugene A. Kies, Albert Pinker, Emmett Hildebrandt, Fred. P. Jay, Alois Shirnberger, Carl Koenigsmann and Charles P. Swain. The objects of the league, as set forth in the literature they are distributing, are the following:

1. To protect independent workmen in their independence.
2. To oppose strikes and lockouts, boycotts and black-lists.
3. To obtain higher wages, shorter hours and better conditions, by:
 - a. More intelligent application of our energies.
 - b. Harmonious co-operation with our employers.
 - c. Legitimate business methods.
4. To furnish favorable conditions for training apprentices, in order that our boys may become successful workmen.
5. To compel officers of the local State and national governments to enforce the laws and to compel labor unions and others to observe the laws.
6. To protect members against unjust treatment from employers by due process of law.
7. To provide an employment bureau for members.
8. To provide means for members to guard against sickness and accident.
9. To provide educational opportunities for all members.
10. To provide in all lawful ways for the welfare of the members and the maintenance of their rights under the laws and the Constitution of the United States.

New Castle employees of the United States Steel Corporation have subscribed for 400 of the preferred shares. Sharon employees took 200 shares and Ellwood City employees took a good number.

At the fourth evening reunion of the American Society of Mechanical Engineers on April 7, Wilfred Lewis of Philadelphia will speak on the "Pick Process for Brazing Cast Iron."

The Structural Steel Employers' Association.

The National Association of Manufacturers and Erectors of Structural Steel and Iron Work, organized several weeks ago for united action against exorbitant demands by the structural ironworkers' unions, held their first regular meeting on March 18, at the office of the American Bridge Company, New York, and considered the present and expected demands of the unions. There was a large attendance. The following was given out as the official list of members of the association:

American Bridge Company, New York; George A. Fuller Company, New York; Terry & Tench Construction Company, New York; J. B. & J. M. Cornell Company, Cold Spring, N. Y.; Cooper-Wigand-Cooke Company, New York; Lewison & Just, New York; John J. Radley Company, New York; Hecla Iron Works, Brooklyn, N. Y.; Richey, Brown & Donald, Brooklyn; Thomas Dimond, New York; Levering & Garrigues Company, New York; Hay Foundry & Iron Works, Newark, N. J.; Milliken Bros., New York; Phoenix Bridge Company, Philadelphia, Pa.; Pennsylvania Steel Company, Philadelphia, Pa.; L. F. Shoemaker & Co., Philadelphia, Pa.; Belmont Iron Works, Philadelphia, Pa.; Boston Bridge Works, Boston, Mass.; Eastern Bridge & Structural Company, Worcester, Mass.; New England Structural Company, Everett, Mass.; G. W. & F. Smith Iron Company, Boston, Mass.; Chelmsford Foundry Company, Boston, Mass.; J. T. Croft & Co., Boston, Mass.; Meguire & Jones Company, Portland, Maine; Boston Steel & Iron Company, Boston, Mass.; Smith & Lovett Company, Boston, Mass.; James H. Tower, Providence, R. I.; Builders' Iron Foundry, Providence, R. I.; Springfield Construction Company, Springfield, Mass.; Riter-Conley Mfg. Company, Pittsburgh, Pa.; Penn Bridge Company, Beaver Falls, Pa.; Champion Bridge Company, Wilmington, Ohio; West Virginia Bridge & Construction Company, Wheeling, W. Va.; Fort Pitt Bridge Works, Pittsburgh, Pa.; Heyl & Patterson, Pittsburgh, Pa.; Columbia Bridge Company, Pittsburgh, Pa.; John Elchleay, Jr., Company, Pittsburgh, Pa.; Pittsburgh Construction Company, Pittsburgh, Pa.; Pittsburgh Steel Construction Company, Pittsburgh, Pa.; Brown-Ketchum Iron Works, Indianapolis, Ind.; Ohio Steel Erecting Company, Steubenville, Ohio; F. J. McCain Construction Company, Pittsburgh, Pa.; R. S. Wright, Pittsburgh, Pa.; L. Schreiber & Sons' Company, Cincinnati, Ohio; McClintic-Marshall Construction Company, Pittsburgh, Pa.; Chicago Bridge & Iron Works, Chicago, Ill.; Wisconsin Bridge & Iron Company, Milwaukee, Wis.; William Grace Company, Chicago, Ill.; Hansell-Elcock Company, Chicago, Ill.; Oliver Sollitt Company, Chicago, Ill.; Kelly-Atkinson Construction Company, Chicago, Ill.; C. L. Strobel, Chicago, Ill.; Oscar Daniels Company, Chicago, Ill.; Modern Steel Structural Company, Waukesha, Wis.

It was agreed that labor disputes affecting any firm or firms in the association should, if necessary, be considered by the association as a body, their decision to be accepted by the firm or firms involved in the dispute. It was explained after the meeting that it will not be necessary in case of local disputes to call a meeting of any but the members in the locality of the dispute. Their decision will be accepted as that of the association. The following announcement was made for the association:

"This association has been formed for the purpose of securing and preserving equitable conditions between employer and employees, whereby the interests of both employer and employee will be properly protected."

The present strikes against the American Bridge Company will be investigated by the association, and so will the demands to be made throughout the country on May 1 by the structural ironworkers.

The monitor "Florida," built at the Crescent plant of the United States Shipbuilding Company, completed on Friday, March 20, the most successful trial trip of her class. She made 12.44 knots, a whole knot above the requirement. She will be turned over to the Government at once.

PERSONAL.

John Stevenson, Jr., the retiring manager of the Sharon Steel Company, Sharon, Pa., before starting on his European tour, sent his check for \$1000 to the Buhl Hospital and for \$250 to each of the nurses.

Albert N. Stanton has resigned as vice-president and a director of the American Tube & Stamping Company, Bridgeport, Conn.

Frank D. Jeffrey has been elected vice-president and general manager of the Union Iron Works, San Francisco, Cal.

J. Harrison Orwig, long connected with the Niles Boiler Company, has been appointed general manager of the Avonmore Construction Company of Avonmore, Pa., a newly organized corporation, who will erect a plant for the production of boilers and plate and structural iron work.

George E. Martin, who has been connected with the shops of the Pedrick & Ayer Company of Plainfield, N. J., as superintendent, has tendered his resignation, which has been accepted.

C. A. Parker has resigned as secretary of the Louisville Bolt & Iron Company, Louisville, Ky., and sold his interest in the concern.

John W. Galvin, superintendent, and John E. Galvin, assistant superintendent, of the Peru Steel Castings Company, Peru, Ind., have resigned.

Daniel G. Reid has been elected vice-president of the Liberty National Bank, New York, of which E. C. Converse is president.

Franz I. Mueller, chief engineer of the Rheinische Stahlwerke, Meiderich, near Ruhrort, Germany, is now on a tour through this country.

Sir Alfred Hickman, president of the British Iron Trade Association, was one of the sufferers of the forgeries of J. Pierpont Morgan's name on bills.

Henry C. Frick of Pittsburgh has gone to California on an extended visit.

Henry Roth has been appointed superintendent of the open hearth department at the steel mill of the Tennessee Company, at Ensley, succeeding Joseph Lemont, who had held the position for three years. Mr. Roth has been connected with the making of steel for a long period and is the patentee for a method for decreasing the time of making the heats. He is also a member of the State Board for Inspecting Steel.

Max Daunert, who for several years has been in charge of the New York office of Schuchardt & Schutte of Berlin, sailed for Europe last Saturday. Mr. Daunert will remain in Europe and arrange for the opening of branches in countries where the company have not yet opened offices.

OBITUARY.

ROBERT S. JAMISON, SR., president of the Jamison Coal & Coke Company of Greensburg, Pa., and a leading figure in the development of the Pennsylvania coal and coke industry, died March 14 at Redlands, Cal., from pneumonia, aged 69 years.

ADAM C. HARPER, vice-president of the Harper Mfg. Company of Chester, Pa., manufacturers of metallic packing, &c., and also Eastern representative of the E. G. Brooke Iron & Steel Company of Birdsboro, Pa., died on March 18 at Chester, Pa., after an operation for appendicitis, aged 40 years.

A. A. BARNES, formerly president of the Peck, Stow & Wilcox Company, died on March 23 at his home in East Berlin, Conn.

HUGH HARBISON, formerly secretary and treasurer of the Colt's Patent Firearms Mfg. Company, died March 10 at his home in Hartford, Conn., aged 70 years. Mr. Harbison was born in Ireland, but went to Hartford when a boy, entering the Colt factory, where he worked his way up. He was also interested in a number of other manufacturing concerns in Hartford.

MANUFACTURING.

Iron and Steel.

Some extensive improvements are being made at Charlotte Furnace at Scottdale, Pa., operated by Corrigan, McKinney & Co., of Cleveland, Ohio. A battery of six 150 horse-power boilers is being installed, together with new blowing engines furnished by the McBeth Iron Works of Cleveland, Ohio. Each engine has 54-inch stroke, 42-inch steam cylinders and 84-inch air cylinders. The fly wheels are 16 feet 6 inches in diameter and weigh 20 tons each. They are turned on rim. The crank shaft is 16 inches diameter and 8 feet 6 inches long. The total height of the engine is 27 feet from floor. The floor area is 16½ x 14 feet. Rated capacity is 13,000 feet of free air per minute. These boilers and engines are supplementary power at the Charlotte Furnace, as the old set are still to be retained.

The new plant of the Norwalk Iron & Steel Company, Norwalk, Ohio, was put in commission March 16, when the first heat of metal was run off. The company will manufacture a high grade tool steel, and are understood to have already a large number of orders on their books. The main building is 100 x 460 feet, with boilers and gas producers alongside, and is equipped with two 30-ton crucible steel furnaces, large and small hammers, and mills to roll sheets and bars. The officers are: President, J. E. Carnahan of Canton, Ohio; secretary and treasurer, James G. Gibbs of Norwalk; general manager, E. E. Erickson of Pittsburgh, and attorney, A. M. Beattie of Norwalk.

The Exeter Iron Company of Reading, Pa., have resumed operations after an idleness of several months. The rolling mill has an output of 250 tons per week and employs about 200 hands.

At Steelton the output of blooming mill No. 1 of the Pennsylvania Steel Company has proven inadequate and will be increased by the addition of new machinery, the foundation of which is now being laid.

A lock out was inaugurated last week at the molding department of the new works of the Eastern Steel Company at Pottsville, Pa. The men asked for an increase of wages and gave the company until Saturday night, March 21, to reply. The company stole a march on the men by dismissing the entire force on Wednesday.

The report that the Allegheny Steel & Iron Company of Pittsburgh, operating sheet mills at Avenue, Pa., would make large additions to their plant is incorrect. The facts are that some parties identified with this company may erect a small plant to make blue sheets of high quality, and the new works may be located at Avenue, but this has not been definitely settled.

The blast furnace of the National Tube Company, at Benwood, W. Va., has been blown in, but the statement that another new stack will be built is incorrect. It is the intention of the National Tube Company to remodel to some extent the old furnace, substituting a skip hoist in place of the present one and a few other minor changes the next time the furnace is blown out for relining.

General Machinery.

The Pennsylvania Air Brake Company of Washington, Pa., have been organized and have applied for a charter. They will manufacture a complete system of railway air brakes to interchange in every particular with the air brakes made by the Westinghouse Air Brake Company and New York Air Brake Company. Advantage will be taken of cheap fuel at Washington. It is the intention of the company to erect a plant of sufficient capacity to turn out 500 sets of freight brakes per day. The officials are H. G. Manning, president and general manager, formerly superintendent of the New York Air Brake Company; C. N. Brady, vice-president; W. P. Paxton, secretary, and A. W. Warne, treasurer.

The Fairbanks Construction Company, Marion, Ohio, have not as yet purchased all of the equipment for their new plant, but have some of it. It is not known at the present time just what will be needed.

Application has been made for a charter for the Scranton Machine Company of Scranton, Pa., for the manufacture of iron or steel or any implement of the same, or of wood, or of steel and wood. The organizers are James Y. Bryden, William B. Smith, Charles F. Richards, William Law and John Robertson.

The Link-Belt Engineering Company, Philadelphia, Pa., have increased their capital stock from \$350,000 to \$500,000.

The American Turret Lathe Company of Warren, Pa., have a force of 30 mechanics at work equipping their plant and setting up the new machinery. The plant will be operated in the course of a month.

Application has been made for a charter for the Carbondale Supply Company of Carbondale, Pa., the character and object of which will be the buying and selling of all kinds of machinery. The organizers are A. P. Troutwein, Nicolai H. Hiller, Gratten A. Singer, Lewis A. Bassett and William J. Hamilton.

The Latta & Martin Pump Company, manufacturers of pneumatic displacing pumps, Hickory, N. C., have increased their capital stock from \$24,000 to \$50,000 and are doubling the

capacity of their plant to meet the requirements of their increasing business.

The Chicago Pneumatic Tool Company, Chicago, within the past few months have brought out several new tools, the most important being a pneumatic hand rock drill and a compression riveter.

The directors of the American Seeding Machine Company, Springfield, Ohio, chosen for the first year are Edward L. Bookwalter, Frank C. Johnson, Burton J. Wescott, James A. Carr, George McNeil, A. M. Bentley, Severn P. Ker, R. H. Rodgers and W. G. Munn. The board organized by the election of the following officers: President, E. L. Bookwalter; first vice-president, James A. Carr; second vice-president, W. G. Munn; third vice-president, F. C. Johnson; treasurer, Burton J. Wescott, and secretary, F. G. Colley.

Wilmarth & Morman Company, Grand Rapids, Mich., state that their shipments in February were fully double those for the same month of last year. Orders for drill grinders were, as usual, received from foreign customers and the general run of manufacturing plants, but the sales to railroad shops showed a substantial increase. Shipments of new Yankee drill grinders since February 1 include: Dry grinders to England, Holland, Harrison Machine Works, Belleville, Ill.; W. T. Payne Mill & Supply Company, Louisville, Ky.; John Boyle Machine Company and Vaughn Machine Company, Peabody, Mass.; Standard Wheel Company and Columbian Enameling & Stamping Company, Terre Haute, Ind.; Owensboro Wagon Company, Owensboro, Ky.; Ashton Valve Company, Boston, Mass.; Howe Mfg. Company, Louisville, Ky.; Fred Dieckman, Cincinnati, Ohio; C. J. Weinman & Co., Dayton, Ohio; Stedman's Foundry & Machine Works, Aurora, Ind.; William Dill Works, Paterson, N. J.; Shepard Lathe Company, Cincinnati, Ohio; Fundicion de Hierro de Torreon Railroad Shops, Torreon, Mexico. Wet grinders: Haisch Wire & Implement Company, Illinois; B. D. Tillinghast, McDonald, Pa.; Choctaw, Oklahoma & Gulf Railroad, Shawnee, Okla.; Pennsylvania Railroad Shops at Tyrone, Bellwood and Ormsby, Pa.; Coleon Mfg. Company, Peoria, Ill.; James Cooper Mfg. Company, Montreal, Canada; Vincennes Bridge Company, Vincennes, Ind.; Townsend, Reed & Co., Indianapolis, Ind.; New York, Ontario & Western Railroad, at Norwich, N. Y.; Carnegie Steel Company, at Munhall, Pa.; J. A. Fay & Egan Company, Cincinnati, Ohio, besides other machines to jobbers and also satisfactory sales of their friction countershafts and mandrel presses.

The Horsburgh & Scott Company have succeeded the old firm of Horsburgh & Scott, Cleveland, Ohio, manufacturers of gears and pinions. They have increased their capital and have found it desirable to increase manufacturing facilities. Accordingly they have purchased a site on Hamilton street near Coe street, in the East End manufacturing district, and will erect a two-story brick building 100 x 120 feet. They will install additional gear cutting machinery to more than double their output. Adjoining the above-mentioned factory the recently incorporated Horsburgh Forging Company will erect a forge shop. The building will be 50 x 100 feet, one story high. They will install considerable new equipment, including a 2500-pound steam hammer. They make small and moderate sized forgings of all kinds and at present are doing a large amount of automobile work. The company are composed of Robert Horsburgh, president, and John H. Horsburgh, secretary and treasurer.

The Cleveland Machine & Mfg. Company, Cleveland, Ohio, have completed arrangements whereby they will manufacture the Detroit automatic stoker for boilers. They are installing the first outfit in the new plant of the American Can Company in that city. They are also at work on a second order of rolling mill rolls for the Colorado Fuel & Iron Company.

The Brown Hoisting Machine Company, Cleveland, Ohio, are erecting several unusually large conveying outfits for foreign shipment. One of them is a contract amounting to about \$350,000 for the shipbuilding yards of Harland & Wolf of Belfast, Ireland. The outfit includes three large cranes mounted on trestles 120 feet high and 600 feet long. Each of the cranes will operate over two ship ways and the entire plant will be motor driven. The cranes will be provided with pneumatic riveters at the sides. For shipment to Japan they are erecting a large coal handling outfit to be installed at Wakamatsu, on one of the southern islands, where coal mines are being opened and a new harbor created. The outfit will consist of a train of buckets each of sufficient capacity to hold the contents of a small car, the buckets to be conveyed and dumped into the hold of a vessel. Among large American contracts they are erecting a conveying outfit for the Pittsburgh & Conneaut Dry Dock Company, at Conneaut, Ohio. Their new shops are running practically on full force and they are having a large amount of work done outside.

Power Plant Equipment.

The Penn State Construction Company of Philadelphia are erecting a 700 horse-power plant for the Westernport-Lonaconing Railway Company, Cumberland, Md. The equipment has been purchased and includes two 350 horse-power engines, two 350 horse-power water tube boilers, and two 225-kw. generators.

From a long list of competitors the Harrisburg Foundry & Machine Company of Harrisburg, Pa., were selected to build a

60 horse-power engine for Tufts College, Boston. Orders for six engines aggregating 1000 horse-power were received this week from Pittsburgh mining companies.

Mayor Samuel G. Pace, Mt. Airy, N. C., advises us that no machinery has been purchased yet for the proposed water works, electric lighting and power plant. The plant is to be operated by water power and bids are now being received for the engineering work. A \$50,000 bond issue has been voted for the work.

J. N. Hutchison, secretary Lima Water Works, Lima, Ohio, informs us that no machinery has been purchased yet for the proposed extension to the water works, and no contracts will be advertised for until after April 6 and maybe not until after May 4, the time the new Board of Public Service takes office. The bonds have all been sold and the money is in the bank. Though the exact kind of machinery has not been decided upon, there will be required about 600 horse-power of boilers and engines, two 15,000,000-gallon centrifugal pumps, 500,000,000-gallon reservoir, 2000 feet of 20-inch iron pipe, valves, specials, &c. The estimated cost is \$150,000. John K. Brill of Lima is designing engineer.

The Park Mfg. Company, Charlotte, N. C., are installing new machinery, including large lathes, to meet the increasing demands of their business.

The Herron-Brady Pump & Foundry Company, Chattanooga, Tenn., recently organized for the manufacture of a full line of improved pumping machinery for mills, mines and furnaces, water works pumping engines, high grade gray iron castings, &c., will let contracts this week for the erection of their new plant. There will be a machine shop, 75 x 150 feet, two stories, with travelling crane of 30 feet span running entire length of building, and galleries on either side of crane 22½ x 150 feet. The foundry will be 100 x 150 feet, equipped with travelling crane of 40-foot span running entire length of building, two cupolas, power elevator, &c. Both buildings will be equipped with the most modern appliances and will be complete in every detail. In addition there will be a separate pattern house and office building. James E. Brady is general manager.

The Walla Walla Gas & Electric Light Company, Walla Walla, Wash., will erect a 4000 horse-power plant on the South Fork of Walla Walla River.

Ira W. Sylvester, C.E., Alexandria, Va., has been retained to prepare plans for a system of water works for Washington, La. There will be artesian well, pumps, boilers, an elevated stack and about ten miles of mains. No purchases will be made until after the meeting of the Water Works Commissioners in April.

The Kewanee Boiler Company of Kewanee, Ill., and offices at 169 East Lake street, Chicago, announce that to facilitate the handling of their product for Western and Southern trade they have opened a branch office and warehouse at St. Louis in charge of G. A. Wells, heretofore manager of the machinery interests of N. O. Nelson Mfg. Company. The company carry in stock for prompt delivery such goods as the market demands, and upon telephone or mail inquiry promise immediate attention to estimates required on power or heating boilers, tanks and radiation.

Engine sales of the Allis-Chalmers Company, Chicago, for February include Southwestern Missouri Electric Light Company, Webb City, Mo., 30 x 60 x 48 horizontal cross compound direct connected Reynolds-Corliss engine; Union Electric Light & Power Company, St. Louis, Mo., 12 x 16 engine; George M. Moulton & Co., Chicago, Ill., 24 and 48 x 48 steeply compound Reynolds-Corliss engine; Louisville Railway Company, Louisville, Ky., two 40 and 78 x 60 vertical cross compound direct connected Reynolds-Corliss engines; Albuquerque Gas, Electric Light & Power Company, Albuquerque, N. M., 16 and 28 x 36 horizontal cross compound direct connected Reynolds-Corliss engine; Chicago File & Rasp Company, Chicago, Ill., one second-hand engine; Denver Engineering Company, Denver, Col., two single differential electric motor driven Riedler pumps; two 16 x 42, one 16 x 36 and one 36 x 48 1890 frame Reynolds-Corliss engines; one 16 x 36, one 14 x 36, one 20 x 48, one 12 x 30 and one 16 x 42 girder frame Reynolds-Corliss engines.

Foundries.

The Girard Foundry Company, Girard, Ohio, have taken over the Davis-Walker-Cooper Company of Youngstown, and the foundry of the latter company will be removed from Youngstown to Girard.

The Scott foundry department of the Reading Iron Company of Reading, Pa., have just closed a contract with the trustees of the Brown segmental wire tube gun for the building of a 6-inch gun and mount. The money for the gun was provided by the National Board of Ordnance and Fortification.

The capital stock of the Butler Street Foundry & Iron Company, Chicago, has been increased from \$25,000 to \$75,000.

The Susquehanna Casting Company of Wrightsville, Pa., have booked orders which will keep them busy until the middle of summer. The company, like the Wrightsville Hardware Company, have scarcely enough labor to meet demands. The hardware company are making large daily shipments, but the product would be larger were not the molding department short-handed.

The Grafton Foundry & Machine Company advise us that their new foundry at Grafton, W. Va., is completed and they are ready for business. They state they will handle the largest work.

The Girard Foundry Company of Girard, Ohio, have elected new officers as follows: Amanuel Hartzell, president; G. M. Gundy secretary and treasurer; Frank Deemer, general manager, and James Cooper, superintendent.

Fires.

The large shoe factory of M. C. Griffin, East Pepperell, Mass., and several other buildings were destroyed by fire March 19. The loss is put at \$300,000.

Gill & Co.'s glass factory at Philadelphia, Pa., was destroyed by fire March 21, entailing a loss of \$50,000.

The Jenison Iron & Steel Shops, Jenison, Mich., were burned March 21, entailing a loss of \$50,000.

The leather factory of Cooley, Costello & Co., Philadelphia, Pa., was destroyed by fire March 21. The loss is placed at \$100,000.

Bridges and Buildings.

The Brown-Ketcham Iron Works, Indianapolis, Ind., report strenuous times in the efforts to keep up with orders, notwithstanding that the starting of the company's Greensburg, Pa., plant more than doubles the capacity for structural work. The company carried over from 1902 to 1903 contracts representing 13,000 tons of material and have since contracted for 3000 tons. These contracts are in Atlanta, Annapolis, Baltimore, Berkeley, Cal.; Boston, Cincinnati, Cleveland, Chicago, Dayton, New Orleans, Newark, N. J.; New York, St. Louis, Utica, N. Y., and Washington, in addition to Indianapolis. The company's total capacity is 70,000 tons a year, about equally divided between the Indianapolis and Greensburg plants. The work at the latter is principally the dressing and finishing of beams and riveting. In addition to this the Indianapolis plant also does ornamental work. The company expect to handle a very large volume of business this year and to work to full capacity if material can be obtained.

The Belmont Iron Works, Philadelphia, structural and ornamental iron, have under consideration the erection of a new plant, and are looking at some sites in the vicinity of Chester, Pa.

Hardware.

F. P. Smith & Co., manufacturers of hardware specialties, Sharon Hill, Pa., have materially improved their facilities during the past six months and are now in a better position to serve the trade than ever before. Particular attention is being given to the workmanship, &c., of their goods, and prompt shipment of orders is promised.

The Waynesburg Pressed Steel Company, Waynesburg, Pa., manufacturers of shovels, spades and scoops and pressed steel specialties, have recently increased their capital stock and are also enlarging their capacity. W. E. Skelton, who is well known to the shovel trade, is now superintendent of the plant.

On the 14th instant work was commenced on an annex to the lock works of E. T. Fraim, Lancaster, Pa. The new building will be 40 x 125 feet, three stories high.

The capital stock of the Elwood Lawn Mower Company, Elwood, Ind., has been increased \$20,000 and plans to increase the capacity of the plant are now under consideration, but nothing definite has yet been decided upon. The present capacity of the factory is said to be 500 machines a week and 25 men are upon the pay roll.

The Illinois Screw Company of Chicago have increased their stock from \$25,000 to \$75,000, the surplus fund being utilized for the increase in stock.

The George H. Merritt Company, Sag Harbor, N. Y., with offices in the St. James Building, 1133 Broadway, New York, have purchased the business carried on for many years by John Fordham of Sag Harbor, in the manufacture of Fordham's well-known eel and fish spears, clam rakes and shark hooks. The company contemplate improving their present holdings by the erection of a two-story brick building and replacing the present steam engine by an improved gas engine and modern machinery. They also make Merritt's patent stuffing-box lubricator in connection with pumps and engines, and are extensively engaged in the manufacture of machinery and tools. Owing to the increased business of the company it has been decided to purchase further property for the erection of a foundry, thus increasing the output of the plant at least 50 per cent.

The Wilke Refrigerator Company, Anderson, Ind., have received an order from Paris for a refrigerator of special design, which it is said is to go to one of the crowned heads of Europe. The exterior will be of enameled white tile, silver mounted.

The Elwood Lawn Mower Company, Elwood, Ind., are behind orders and have had to turn down some because of limited capacity, which is 500 machines a week. The company will increase their capital stock \$20,000 and double their capacity.

The Ventura Mfg. & Implement Company, Ventura, Cal., have been organized for the purpose of manufacturing a patented cylinder nut wrench and a belt guide for threshing machines.

They are taking up and enlarging an existing plant and will eventually build and remove to larger quarters. They have purchased such machinery as their immediate necessities require.

Miscellaneous.

The Traction Elevator Company, 35 Nassau street, New York, recently incorporated, manufacture an elevator built on new principles of rope traction for which they claim great advantages in the small space occupied, low cost of repair, perfection of control and safety. They have had an elevator in the German-American Building which has traveled 375 miles since February 16, giving absolutely satisfactory service.

The Cincinnati Sand Blast Company, Cincinnati, Ohio, makers of chipped glass signs, have increased their capital stock from \$25,000 to \$75,000 and will erect a new plant this summer.

The Bay State Tap & Die Company have erected a new plant at Mansfield, Mass., which will be in operation April 1. Their former plant at Taunton had become too small to take care of their increasing business, and with the new plant modernly equipped they hope to have ample capacity to execute orders promptly.

The New Haven Car Register Company, New Haven, Conn., announce the sale of their business to the International Register Company of Chicago, Ill., who will continue the manufacture of the New Haven type of register at Chicago, where the New Haven plant will be moved and the two combined.

The Scovill Mfg. Company, Waterbury, Conn., manufacturers of brass and German silver sheets, rolls, rods, wire, &c., have made application to the Legislature of Connecticut for authority to increase their capital stock from \$2,500,000 to \$5,000,000.

Plans are completed and estimates are being received for the new rolling mill building of the Phosphor-Bronze Smelting Company, Limited, Philadelphia. Harrison safety water tube boilers will be installed and the steam engine and machinery are being built by R. S. Newbold & Son Company of Norristown, Pa.

The Eclipse Gas Stove Company, Rockford, Ill., are about to erect an addition, two stories in height and covering an area 60 x 203 feet. The company will also build a power house, 50 x 56 feet, and a japanning room, 22 x 30 feet. The new buildings, which have been designed by Architect Keyt, will be of brick and steel construction. We understand that the business of the company has increased to such proportions that they are unable to promptly fill their orders; hence the addition to their capacity.

A large building will be erected on the Warwick Furnace property, Pottstown, Pa., by Rambo & Co. of Swedeland, to manufacture a mineral product from slag and clinder that will be used for covering steam boilers and pipes.

The Dublin Agricultural Implement Company, Dublin, Ind., just organized, will equip a factory. They will occupy the buildings of the Hussey Mower & Implement Company, who have moved to Knightstown, where a building is being erected for them.

The Cleveland Chamber of Commerce are exerting their efforts toward securing for Cleveland, Ohio, the proposed plant of the McClean Arms Company, who for a year or so have conducted an experimental plant in that city, developing the rapid firearms invented by Dr. Samuel N. McClean. A number of Cleveland capitalists have been backing the enterprise, and now that the guns have been perfected and pronounced a success, it is proposed to organize a company with from \$2,000,000 to \$3,000,000 capital to exploit the inventions. Under the McClean system the gas caused by one discharge is utilized to load and explode the next cartridge, and by merely pressing the trigger there is a steady stream of bullets so long as there are cartridges in the gun. It is also claimed that the system entirely eliminates all recoil and that it may be utilized on the largest guns as well as in firearms.

The F. B. Stearns Company, Cleveland, Ohio, manufacturers of gasoline automobiles, are moving into a new addition to their shop which will nearly double their capacity. They have recently installed a large Lucas boring mill, three Draper lathes, a Fellows gear shaper and other tools, and will shortly add to this assortment. They are getting out two gasoline cars per week, their machines being of large size, 24 horse-power, and sell at \$3000.

The Eclipse Car Fender Company, Cleveland, Ohio, manufacturers of a patent street car fender, are preparing to establish a factory for the production of their device, which heretofore has been manufactured to their order by outside parties. They have recently secured several orders from large street railway systems.

The Morgan Wood & Iron Works, Spartanburg, S. C., successors to the Morgan Iron Works, have been incorporated under the State laws of South Carolina with a capital stock of \$40,000. The president and treasurer is W. M. Jones; secretary, W. L. Montgomery, and directors, W. M. Jones, W. L. Montgomery, John Gary Evans, Grange L. Coffin, George W. Nichols and H. L. Bonar. The company will manufacture all kinds of wooden building material and do general machine and foundry repair work. It is their intention to take up the manufacture of some new iron lines in the near future.

The Cape Breton Coal & Iron Company is the name of a new company organized at Des Moines, Iowa, by the merging of the Lake Ainslie Mining Company, who were organized some three years ago, with D. R. Ewing as manager, the Lewis Mountain Mining Company and the Margaree Mining Company. The stockholders are for the most part residents of Des Moines. The officers of the reorganized company are: N. E. Coffin, president; Oren Ruffcorn, vice-president; L. C. Bricker, treasurer, and E. H. Decker, secretary, who, together with Chas. Crane, D. B. Brown, H. H. Reynolds, J. M. Goodson, F. H. Fitting, Dr. J. T. Fellows and H. J. Deards, constitute the Board of Directors. The properties of the company are located in Inverness County, Cape Breton Island, Canada, and embrace an area of 105 miles.

It is stated that the Gloucester Land Company have transferred to Henry S. Morse, president of the New York Shipbuilding Company, Camden, N. J., the works of the old Gloucester Iron Company, on the south side of Newtown Creek and along the Delaware River. The transaction includes the riparian rights and the surrounding property. The consideration in the deed is \$80,000.

The Federal Mfg. Company of Cleveland, Ohio, have closed a contract with the Shelby Steel Tube Company of Pittsburgh, whereby they will handle the steel trolley poles built by the latter throughout the United States and Canada. The poles built by the Shelby Company are tested before shipment by suspending 12 feet from the butt end a weight of 40 pounds, which must not produce a deflection in the pole greater than 12 inches, and when this weight is removed, if the pole does not spring back to its original position it is rejected. Poles are made in 12, 13, 14, 15 and 16 foot lengths.

The Trolley Supply Company of Canton, Ohio, have organized to manufacture the Knutson trolley retriever and other devices for electric railway work. The Knutson retriever is attached to the trolley pole by cord and consists of a weak and heavy spring, actuating disk and wheel, adjustable to different trolley pole tensions, and controlled by an automatic locking and releasing device. A sudden upward movement of 3 to 4 inches will throw governors out and trip the heavy retriever spring, whose action will instantly bring down the trolley pole 6 to 8 feet below the trolley wire.

The directors of the Structural Steel Car Company of Canton, Ohio, have voted to increase the capital stock to \$1,000,000. H. A. Cavanah, formerly manager of the Bucher-Gibbs Plow Company, Canton, Ohio, has been elected president, and William Wagner of Canton, vice-president. An option has been taken on 55 acres of land in the vicinity of the present shops for the enlargement of the plant. All classes of steel, combination and wooden cars will be built. W. H. Woodcock will be the mechanical engineer of the new plant.

The Jewett Car Company of Newark, Ohio, are making numerous improvements to their plant. They are doubling the capacity of their blacksmith shop, erecting new paint and erecting shops and are installing pneumatic equipment throughout. They will also erect a new boiler house and have contracted for the boiler equipment.

It is reported that the Crucible Steel Company of America, with main offices in the Frick Building, Pittsburgh, are negotiating for the purchase of the Carpenter Steel Company of Reading, Pa., and the Firth-Sterling Steel Company of Pittsburgh, with works at Demmler, Pa. Both of these companies are manufacturers of projectiles and also special brands of high grade steel. The Carpenter Steel Company product consists of crucible steel for tools, dies, cutlery, wire, &c., and forgings and armor piercing projectiles, the annual capacity of the plant being 9000 gross tons of crucible steel ingots and 25,000 tons of rolled and forged products. The company also operate a machine shop and cold rolling and wire drawing plant. The Firth-Sterling Steel Company plant contains two 30-pot crucible steel melting furnaces, nine heating furnaces, seven hammers and three trains of rolls, the output being fine crucible tool steel and Wheeler-Sterling armor piercing projectiles. This company also operate a machine shop containing lathes, boring mills, &c. At the offices of the Carpenter Steel Company in this city it was stated that nothing whatever is known of the reported negotiations.

The Pittsburgh Filter Mfg. Company, manufacturers of gravity filters, pressure filters and water softening plants, have removed from the Empire Building to the Farmers' Bank Building, Pittsburgh, Pa.

An error was made in our issue of March 19 in the publication of the names of the officers of the Standard Engineering Company of Ellwood City, Pa. The correct name of the secretary is John M. Shaw, and not John McShane as printed.

The Iron and Metal Trades.

While official statements are entirely lacking, Pittsburgh opinion seems to be quite general that not alone has the sale of the Jones & Laughlin properties to the United States Steel Corporation been settled, but that the Clairton plant and the Snyder Ore and furnace interests have been acquired. It is generally believed that a suitable opportunity is being awaited to make an official announcement. The effect of these transactions in the Iron and Steel industry would be far reaching and momentous.

There have been few events during the past week to indicate any tendency toward change in the Iron markets. Reports from Cleveland indicate that thus far quite a large tonnage of Lake Ore has been sold. The early opening of navigation is a point in favor of Ore shippers, the rates for this season's water transportation being still under negotiation.

In the East the movement in Basic, Low Phosphorus and Bessemer Pig has virtually closed, buyers being covered. In the Chicago district a good deal of tonnage of Basic Pig is under negotiation, buyers and sellers being about 50 cents a ton apart, however. In the Pittsburgh district the leading interest has put aside entirely for the present the question of purchasing Bessemer Pig for delivery during the second half.

A little more interest is being shown in the Foundry Iron markets in the Central West and West, but buyers are still acting very cautiously about committing themselves for the second half, with the exception of the large interests directly connected with the manufacture of rolling stock.

The Steel market has been quiet lately, with foreign makers still firm. Reports from abroad insist that the home markets show greater confidence and increased activity.

Favorable reports come from practically all the branches of the Finished Iron and Steel trades, and the tonnage being booked is large. Deliveries are much better than they have been, but there is still some complaint of scarcity of raw material.

In the Chicago district the final collapse of the efforts to bring about a consolidation of the independent Bar mills has led to sharper competition and a lower range of values on Bar Iron. In the Merchant Steel market some contracting for the season beginning July 1, 1903, has been done by agricultural implement makers, and a lively movement may follow.

The Sheet trade is active, and there is continued talk of the chance of an early official announcement of an advance in prices. The movement to consolidate the independent Sheet mills is actively proceeding.

In the Eastern Plate trade prices are now being made which are closer to the official Pittsburgh basis.

The leading interest in the Tin Plate trade is offering to book orders at present prices for delivery up to July 31.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	Mar. 25, 1903.	Mar. 18, 1903.	Feb. 25, 1903.	Mar. 26, 1902.
PIG IRON:				
Foundry Pig No. 2, Standard.				
Philadelphia	\$22.25	\$22.25	\$22.25	\$18.75
Foundry Pig No. 2, Southern,				
Cincinnati	21.25	21.25	21.75	15.00
Foundry Pig No. 2, Local, Chicago	22.50	23.00	23.00	18.50
Bessemer Pig, Pittsburgh	21.85	21.85	21.50	17.50
Gray Forge, Pittsburgh	21.00	21.00	20.75	18.00
Lake Superior Charcoal, Chicago	26.50	26.50	26.50	21.00

BILLETS, RAILS, ETC.:

Steel Billets, Pittsburgh	31.00	31.00	30.00	31.00
Steel Billets, Philadelphia	29.00	28.50	27.50	33.00
Steel Billets, Chicago	31.50	31.00	30.75	....
Wire Rods, Pittsburgh	37.00	37.00	36.00	36.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago	18.50	18.25	18.00	17.50
O. Steel Rails, Philadelphia	21.25	21.25	20.75	....
O. Iron Rails, Chicago	24.00	24.00	24.00	24.00
O. Iron Rails, Philadelphia	24.50	24.50	24.50	24.00
O. Car Wheels, Chicago	24.00	24.00	24.00	19.00
O. Car Wheels, Philadelphia	24.50	24.50	24.50	17.50
Heavy Steel Scrap, Pittsburgh ..	21.50	21.00	21.50	....
Heavy Steel Scrap, Chicago	18.25	18.25	18.50	16.75

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia.	1.93½	1.95	1.93¼	1.92
Common Iron Bars, Chicago	1.80	1.86½	1.85	1.85
Common Iron Bars, Pittsburgh.	1.89¾	1.89¾	1.80	1.80
Steel Bars, Tidewater	1.75	1.75	1.75	1.75
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.60
Tank Plates, Tidewater	1.85	1.95	2.00	1.78
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.75	1.75	1.75	1.85
Beams, Pittsburgh	1.60	1.60	1.60	1.70
Angles, Tidewater	1.75	1.75	1.75	1.75
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh.	2.05	2.05	1.95	1.95
Skelp, Sheared Iron, Pittsburgh.	2.10	2.10	2.05	2.00
Sheets, No. 27, Pittsburgh	2.65	2.65	2.60	3.00
Barb Wire, f.o.b. Pittsburgh	2.60	2.60	2.60	2.90
Wire Nails, f.o.b. Pittsburgh	2.00	2.00	2.00	2.05
Cut Nails, Mill	2.10	2.10	2.10	1.95

METALS:

Copper, New York	14.50	14.75	13.00¼	12.00
Spelter, St. Louis	5.25	5.25	4.87½	4.12½
Lead, New York	4.65	4.65	4.10	4.10
Lead, St. Louis	4.57½	4.55	3.97½	4.00
Tin, New York	29.25	29.80	29.50	26.00
Antimony, Hallett, New York ..	7.00	6.75	6.87½	8.00
Nickel, New York	40.00	40.00	40.00	50.00
Tin Plate, Domestic, Bessemer,				
100 pounds, New York	3.90	3.99	3.79	4.19

* Foreign.

Chicago.

FISHER BUILDING, March 25, 1903.—(By Telegraph.)

There seems to be reason to anticipate a more active buying movement in Pig Iron, at least buyers are showing more disposition to consider seriously the placing of contracts for the last half of the year, especially for the third quarter, and furnaces seem less disposed to be unyielding, although they are still relatively firm in their views. Sales are gradually increasing, the aggregate tonnage being larger than for many weeks, although individual transactions are not especially large. The demand continues to be principally for Basic and Bessemer Iron, although there is more movement in Foundry grades. Occasionally furnaces have made concessions, but are generally holding out for \$18, Birmingham, for No. 2 Foundry and \$17.50, Birmingham, for Basic. At 50c. under these prices there are buyers of round lots of both Foundry and Basic, one Steel company standing ready to place orders for 40,000 tons of Basic at \$17. Sales are being made at Virginia furnaces about \$1 above these prices, relatively the same basis. Larger sales are reported in the Valley of Bessemer Iron and Stove founders are reported to be buying some little foreign Iron at Detroit, but melters in the Chicago district show some antipathy toward foreign Pig. One important feature of the week has been the renewal of keen competition among the Bar Iron mills, resulting in a drop in prices, 1.80c. to 1.85c. being now current. There have been a few additional contracts placed for Steel Bars for next season running up to July, 1904. The same is true of Spring Steel and Agricultural Shapes. For Structural Material and Plates for prompt delivery premiums of from \$2 to \$3 per ton over official quotations are current. Inde-

pendent mills have either withdrawn or advanced prices of Black Sheets and Galvanized Sheets have shown a hardening tendency. There has been some trading in Cast Pipe, several cities having placed contracts within the past few days. Billets are entirely nominal at this point. Rails, both Heavy and Light, have shown a decided falling off as far as new tonnage is concerned. Copper and Lead, while strong, have shown less tendency to advance, but Spelter and Sheet Zinc are both higher. Coke has been in more ample supply and the tendency is toward lower prices rather than otherwise.

Pig Iron.—While the demand has continued largely for Basic and Bessemer Iron, there has been some little increase in sales of Foundry grades. It is significant, too, that the buying has been largely for the second half, especially the third quarter of the year; yet the transactions have not been large in the aggregate, but little over 25,000 tons, while individual transactions have not been over 6000 tons. Mainly the sales have ranged from 1000 to 2000 tons, with the usual number of carloads and 100 to 200 ton lots. With one or two exceptional sales furnaces have shown no disposition to change their previous attitude, being unwilling to sell Foundry Iron under \$18 for No. 2, Birmingham. The exceptions noted have been lots of 1000 and 2000 tons for the third quarter wherein \$18 has been shaded. Basic Iron has been sold on the basis of \$18.50, Virginia furnace, and \$17.50, Birmingham, but there are buyers of upward of 40,000 tons at 50c. under these prices, sales this week being but little over 5000 tons for delivery during the last half of the year. Several lots of 200 to 300 tons of Malleable Bessemer have been sold at \$23.25, for delivery extending from April to July inclusive, and Standard Bessemer at \$23 to \$23.50 for the second quarter, but for sales covering the last half of the year \$20 to \$20.50 at furnace is reported to have been accepted by producers in the Valley. With the starting up of the local furnaces prices for the last half of the year have been made on the basis of \$23, \$22.50 and \$22, for Nos. 1, 2 and 3 Foundry, respectively. But there is still little if any local Foundry Iron available for prompt delivery. There is considerable High Silicon Iron offered in the South, and with less demand the market for this grade is decidedly easier. No. 1 and No. 2 Soft are also in more ample supply, but little is heard of Mill grades in this section. There are reports of sales of foreign Iron having been made in lots of 5000 to 6000 tons to Stove founders on the basis of \$22 to \$22.25, delivered Detroit. In this immediate section, however, there has been little disposition to purchase foreign brands. The more ample supply of Coke which has been available in this section during the week has not only permitted the blowing in of one or two merchant furnaces, but several of the stacks that have been idle at the Illinois Steel are expected to blow in in a few days. Sales of single car lots and 100 to 200 ton lots of Lake Superior Charcoal Iron have been made at prices ranging from \$26.50 to \$27.50, according to grade, for delivery during the second and third quarters. The following are the prices current, f.o.b. Chicago, the outside price being for prompt and the inside for delivery during the last half of the year:

Lake Superior Charcoal.....	\$26.50 to \$27.50
Local Coke Foundry, No. 1.....	23.00 to 24.00
Local Coke Foundry, No. 2.....	22.50 to 23.00
Local Coke Foundry, No. 3.....	22.00 to 22.50
Local Scotch, No. 1.....	24.00 to 25.00
Ohio Strong Softeners, No. 1.....	26.30 to 27.30
Southern Silvery, according to Silicon.....	24.35 to 26.35
Southern Coke, No. 1.....	23.35 to 23.85
Southern Coke, No. 2.....	22.35 to 22.85
Southern Coke, No. 3.....	21.35 to 21.85
Southern Coke, No. 1 Soft.....	23.35 to 23.85
Southern Coke, No. 2 Soft.....	22.35 to 22.85
Foundry Forge.....	20.85 to 21.35
Southern Gray Forge.....	19.85 to 20.35
Southern Mottled.....	19.35 to 19.85
Southern Charcoal Softeners, according to Silicon.....	25.85 to 27.85
Alabama and Georgia Car Wheel.....	28.35 to 28.85
Malleable Bessemer.....	22.50 to 23.50
Standard Bessemer.....	22.50 to 23.50
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon.....	31.30 to 32.30

Bars.—The failure to consolidate the independent Bar Iron interests in this section has resulted, during the past few days, in a renewal of the keen competition which existed several months ago. There has been a fair degree of activity in the market, however, and while early in the week sales were made on the basis of 1.90c., more recent sales of 1000 tons and under have been made at 1.85c., and at the close round lots would not be refused at 1.80c., Chicago; in fact, some sales have been made on this basis. Regarding Soft Steel Bars there has continued to be an active inquiry, and several further sales for the season's requirements extending into the spring of 1904 have been made, lots ranging from 1000 to 3000 tons, in the aggregate there being a fair tonnage. There has also continued to be considerable specifying on old contracts covering the remainder of the present season. The following are the prices current, f.o.b. Chicago, for domestic product, mill shipment: Bar Iron, 1.80c. to 1.90c.; Soft Steel Bars, 1.76½c. to 1.86½c.; Hoops, 2.16½c. to 2.26½c.; Angles, under 3 inches, 1.86½c. to 1.91½c., base. There has continued to be a fair merchant trade, and

the market has remained steady, as follows: Bar Iron, 2.15c.; Soft Steel Bars, 2c. to 2.25c.; Angles, 2.25c., and Hoops, 2.40c., base, from store.

Structural Material.—No large transactions have been reported during the week, but there has been a fair run of small orders, ranging from 200 to 700 tons each, mainly for local buildings, including warehouses, office buildings, breweries and churches, mainly for delivery during the summer and fall. There has continued to be quite an active demand for small lots of Beams, Channels and Angles from local stocks, and also for mill shipment for prompt delivery, upon which a premium of \$2 to \$3 per ton is readily obtained. The following are the prices current, at Chicago, for mill shipment for long delivery, 15c. premium being charged for shipment within six weeks: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c.; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. The demand from local stocks, as previously noted, has increased, and the market is strong at the following prices: Beams and Channels, 2¼c. to 2½c.; Angles, 2.25c. to 2.50c.; Tees, 2.30c. to 2.55c., at local yards.

Plates.—Notwithstanding that the mills are so far sold ahead, the demand continues active and even urgent, but sales have not aggregated over 2000 tons, for delivery during the latter part of the year. For prompt shipment premiums of \$2 to \$3 per ton are readily obtained over official quotations. The prices for long time delivery, f.o.b. Chicago, are as follows, 15c. per hundred being added for deliveries within 30 to 60 days: Tank Steel, ¼-inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.10c.; Marine, 1.95c. to 2.10c. The demand from local stocks has continued on a liberal scale, and the market has remained strong. The following are the prices current: Tank Steel, ¼-inch and heavier, 2.15c. to 2.20c.; Tank Steel, 3-16-inch, 2.25c. to 2.30c.; No. 8, 2.30c. to 2.40c.; Flange Steel, 2.40c. to 2.50c., all f.o.b. warehouse, Chicago.

Sheets.—Independent mills have advanced prices of Black Sheets sharply, and there has been a further hardening of prices of Galvanized. It is reported that the official quotations will be advanced on April 1, but it is difficult to obtain even now shipments from independent mills under the basis of 2.80c. for No. 27, at the mill. The rumors of higher prices have naturally stimulated the demand. The following are the prices current for mill shipment, carload lots, f.o.b. Chicago: No. 20, 2.60c. to 2.65c.; Nos. 22 and 24, 2.65c. to 2.75c.; No. 26, 2.75c. to 2.85c.; No. 27, 2.85c. to 2.95c.; No. 28, 2.95c. to 3.05c. Small lots are sold from store at 15c. to 20c. above mill prices. The few mills which have been selling Galvanized Sheets under 75 and 10 for mill shipment have withdrawn, although in exceptional instances concessions have been made. Sales from store are made mainly at 75c. with exceptional transactions at 75 and 5 discount.

Cast Pipe.—There has been an improved demand, several municipal contracts having been placed during the week, one lot of 3000 tons for the city of Cleveland, including 6's to 48's, at \$32.25, delivered; also about 4500 tons of 6's to 36's to the city of St. Louis at \$32.50, delivered. Several smaller lots of 4's to 6's and also 20's and larger sizes have been placed in other sections, including 1000 tons of 20's, delivered at New Castle, Pa. There has been a moderate demand from railroads and mining companies at previous prices. Manufacturers continue to quote, f.o.b. Chicago, as follows: 4-inch, \$34; 6-inch, \$33; 8-inch and larger, \$32 for Water and \$1 per ton higher for Gas Pipe.

Billets.—While there has continued to be a good demand for both domestic and foreign Billets, with considerable activity reported on the Eastern seaboard, in which local firms have an interest, the local market has been confined to jobbing transactions. The foreign market is reported much stronger, and it is now difficult, if not impossible, to lay down Billets at Chicago under \$31.50 to \$32, delivered. Domestic Bessemer Re-rolling Billets are nominally quotable at the same price. There has been a good jobbing trade for Open Hearth Forging Billets, prices ranging from \$34 to \$38, according to analysis, buyer and time of delivery, although in exceptional instances \$1 to \$2 per ton more has been realized.

Merchant Pipe.—There has continued to be an active demand for all sizes, jobbers especially renewing contracts liberally, and with the mills already sold well into the future the market continues strong at full prices. The following is the official schedule of discounts for carload lots, Chicago, base, random lengths, mill shipment:

	Steel Pipe.		Guaranteed Wrought Iron.	
	Black.	Galvd.	Black.	Galvd.
	Per cent.	Per cent.	Per cent.	Per cent.
¼ to ¾ inch.....	66.35	56.35	63.35	53.35
½ inch.....	68.35	58.35	65.35	55.35
¾ to 6 inches.....	73.35	63.35	70.35	60.35
7 to 12 inches.....	67.35	57.35	64.35	54.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—The market has remained firm in tone, with a fair movement, but without change in prices. The following is the schedule of discounts for carload lots, Chicago, mill shipment:

	Steel.	Iron.
1 to 1½ inches.....	43.35	38.35
1½ to 2½ inches.....	55.85	35.85
2½ to 5 inches.....	60.85	45.85
6 inches and larger.....	55.85	35.85
Less than carloads, 12½ per cent. advance.		

At the new basis established recently for store trade there has been no disposition to cut prices, the following quotations being well sustained with a fair volume of business. The following are the discounts made for shipment from local store:

	Steel.	Iron.
1 to 1½ inches.....	40	35
1½ to 2½ inches.....	50	32½
2½ to 5 inches.....	57½	42½
6 inches and larger.....	50	..

Merchant Steel.—There is some evidence that buyers are sufficiently satisfied with the outlook to place orders for the season's requirements of Spring and Agricultural Shapes, wagon manufacturers and a few small agricultural concerns having placed contracts for the season extending from July, 1903, to July, 1904. There has also been a good demand for Tool Steel, several contracts having been placed for the season's requirements, especially by jobbers, although the principal buyers otherwise have been railroad shops. The following are the prices current for mill shipment: Smooth Finished Machinery Steel, 2.01½c. to 2.11½c.; Smooth Finished Tire, 1.96½c. to 2.11½c.; Open Hearth Spring Steel, 2.66½c. to 2.76½c.; Toe Calk, 2.31½c. to 2.46½c.; Sleigh Shoe, 1.86½c. to 1.96½c.; Cutter Shoe, 2.41½c. to 2.61½c. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 8c. for mill shipment; Specials, 12c. upward.

Rails and Track Supplies.—Compared with previous weeks, the week under review has been quiet, there being an absence of large transactions and even less demand for smaller amounts. There have been a number of sales, however, ranging from 1000 to 2000 tons of Standard Sections, and a fair inquiry for Light Sections on the basis of previous quotations, the market remaining firm at \$28 for Standard and \$27 for second quality, mill shipment. Light Rails continue to sell at from \$35 to \$40, according to weight, premiums being asked on small lots for prompt shipment. Track Supplies have continued active and strong, with full prices readily realized. The following are the prices current for mill shipment: Splice or Angle Bars, 2c. to 2.25c.; Spikes, 2.10c. to 2.25c.; Track Bolts, 3½ to 3¾ inches and larger, with Square Nuts, 2.85c. to 3c.; with Hexagon Nuts, 3c. to 3.25c. From store 10c. to 15c. over mill prices are asked and obtained.

Old Material.—A little stronger tone has been developed for Old Steel Rails, both mixed and long lengths, and prices are slightly higher. On the other hand, Heavy Cast Scrap and Cast Borings have developed an easier tone and prices have declined about 50c. per ton. The difficulty of obtaining cars for movement of Scrap is having some impression upon the market. The following are the prices per gross ton, Chicago:

Old Iron Rails.....	\$24.00 to \$24.50
Old Steel Rails, mixed lengths.....	18.50 to 18.75
Old Steel Rails, long lengths.....	22.00 to 22.25
Heavy Relaying Rails.....	31.00 to 31.50
Old Car Wheels.....	24.00 to 24.50
Heavy Melting Steel Scrap.....	18.25 to 18.50
Mixed Steel.....	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates.....	\$21.00 to \$22.00
Iron Car Axles.....	24.50 to 25.00
Steel Car Axles.....	23.50 to 24.00
No. 1 Railroad Wrought.....	20.00 to 20.50
No. 2 Railroad Wrought.....	18.25 to 18.75
Shafting.....	20.00 to 21.00
No. 1 Dealers' Forge.....	16.50 to 17.00
No. 1 Bushing and Wrought Pipe.....	14.00 to 14.50
Iron Axle Turnings.....	14.50 to 15.00
Soft Steel Axle Turnings.....	14.50 to 14.75
Machine Shop Turnings.....	14.25 to 14.75
Cast Borings.....	10.25 to 10.50
Mixed Borings, &c.....	10.50 to 11.50
No. 1 Boilers, cut.....	14.50 to 15.00
Heavy Cast Scrap.....	18.00 to 18.50
Stove Plate and Light Cast Scrap.....	13.50 to 14.00
Railroad Malleable.....	16.25 to 16.50
Agricultural Malleable.....	15.50 to 16.00

Metals.—Copper has continued quiet but firm without essential change in prices, Lake being now quoted at 14¾c. to 15c. in carload lots, and 15¼c. in a jobbing way. Pig Lead has continued strong, but there has been but little activity in this market, there still being considerable difficulty in making shipments. The market closed firm at 4.60c. in 50 to 100 ton lots, 4.62½c. in carload lots for 30 to 60 days, and 4.65c. for longer time. Spelter has continued strong with a good demand at a further advance, the market closing firm at 5.35c. for Slabs in carload lots. Sheet Zinc has been advanced ½c., the market now being 6¼c., Chicago. Old Metals have continued strong with a good demand, with Lead Pipe higher, but other kinds without essential change. Heavy Cut Copper is now quoted at 12¾c.; Red Brass, 13c.; Copper Bottoms, 11¾c.; Lead Pipe, 4.35c., and Zinc, 4c., spot.

Coke.—Receipts of Coke have continued more ample, and although the demand continues good, the market is weaker in tone for both Furnace and Foundry grades. Prices, how-

ever, remain without essential change, Virginia Coke selling for \$9 to \$9.50, and Connellsville at \$10 to \$10.50, spot, track, Chicago.

Philadelphia.

FORREST BUILDING, March 24, 1903.

The Iron and Steel markets show but little change, either in price or demand, both of which are fairly satisfactory. There is a better supply of Coke and Coal, and although there is some complaint of a shortage of Rail facilities, conditions in that respect are better than they have been for months past. This permits a larger production in both Pig Iron and of Finished Material, and it is believed that the volume of business at the present time is the largest on record. There are no signs of overproduction, however, as everything is taken at quoted rates, some articles being a shade higher, others steady and unchanged. Prospects continue to be favorable, and as far as can be seen everything points to the largest volume of business the country has ever known. The railroads have so much to do in the way of improvements, extensions and renewals, that they must necessarily be large buyers, and as the agricultural interests are enjoying phenomenal prosperity, they, too, will doubtless keep up their end of the business. With the leading interests of the country fully employed, the lesser are pretty sure to be included, as they, to a great extent, are the auxiliaries of the larger concerns. At the present time it is believed that there is a larger and more general distribution of work in progress than ever before, and unless something unforeseen occurs, 1903 is likely to be another record breaker. Prices are fairly well settled, a little too high perhaps in some lines, a little too low in others, and prospects for a better adjustment are not very encouraging, but with an abundance of work there is a disposition to accept the situation philosophically, in the hope that time will bring its own cure. Foreign markets are stronger, and look as though business in other countries has made a turn for permanently better conditions. If this should prove to be the case, the effect in this country would be of vast importance, and would surely lead to advanced prices and a renewed period of prosperity. This of course is merely an opinion, but there are possibilities in this direction that are worth considering. On the whole, therefore, the tendency appears to be toward improvement in the general situation, although for the present prices (except Steel Billets) are the same as last week.

Pig Iron.—There is a good demand for Pig Iron, and in spite of large production everything appears to be taken at unchanged prices. This refers not only to prompt shipments, but for deliveries during the last half of the year, all of which are easily saleable at last week's prices. There is nothing speculative in the situation, however, purchases are made simply because material is needed, and after last season's experiences buyers are not disposed to depend on hand-to-mouth purchases. Besides that, there is nothing in sight likely to affect prices unfavorably, while there are distinct possibilities in the way of improvement. One is the increasing cost for imported material, and as 10,000 to 12,000 tons per week has been coming in until recently, a decrease in supply or an increase in cost would soon make itself felt. Compared with the total supply the tonnage named is a trifle, but it is the trifle that turns the market. Even a single 1000 tons per week more than is wanted, or 1000 tons less than is wanted, gives character to the tens of thousands of tons that are taken, hence the importance of trifles as indicating the general trend of events. Special Irons, such as Basic, Low Phosphorus and Bessemer Irons, are not as excited as they were a week or two ago. Consumers have covered their requirements for some time to come, so that only odds and ends of business is being done temporarily. Prices are unchanged, and will probably remain so until there is more Iron for sale or more Iron wanted. English and Scotch Irons can be had at the old figures, but on new lots more money would probably have to be paid. Lots afloat or on the spot are let go to save charges, but they could hardly be replaced at the same money. The usual prices for lots on all grades delivered in consumers' yards, Philadelphia, or nearby points are about as follows:

No. 1 X Foundry.....	\$23.50 to \$24.50
No. 2 X Foundry.....	22.25 to 22.50
No. 2 Plain.....	21.50 to 22.00
Gray Forge.....	19.50 to 20.50
Basic.....	20.00 to 20.50
Middlesbrough, No. 3.....	21.00 to 21.50
Scotch.....	22.50 to 23.50

Cargo lots, c.i.f.:

Low Phosphorus.....	\$21.25 to \$21.50
Bessemer.....	20.25 to 20.50
Middlesbrough, No. 3.....	19.00 to 19.50

Billets.—There is a great scarcity of Steel, and prompt shipments of either foreign or domestic are hard to secure at the present time. Prices for prompt Steel are therefore difficult to quote, but \$29 would probably be paid for foreign, or \$32.50 and upward for domestic. For cargo lots (with some leeway in regard to dates of shipments), a dollar

better might possibly be done, but the urgency is for quick deliveries.

Plates.—There is a good demand, and a heavy tonnage is being entered, but at some concession in prices when the orders are of special importance. Prices in the East have for some time been at a premium compared with those in the West, so that with increased capacity for producing Plates, prices are beginning to even up, particularly when large tonnages are involved. One lot of several thousand tons was taken at 1.90c. for Ship Plates, but 1.95c. to 2c. is the usual quotation, and a little over 2c. for less than carload lots. Average prices, however, would be about as follows for nearby deliveries: Small lots, 2.10c.; carload lots, $\frac{1}{4}$ -inch and thicker, 1.95c. to 2c.; Universals, 1.95c.; Flange, 2.10c. to 2.15c.; Fire Box, 2.20c. to 2.25c.; Marine, 2.30c. to 2.35c.

Structural Material.—There is no scarcity of business, although fair deliveries can be made for almost all sizes. Prospects are regarded as extremely favorable, as requirements during the coming summer are likely to be the largest on record. The capacity for production is much larger, however, so that it is not likely that premiums such as were paid last summer will have to be paid this year, delivered prices to-day being, as for some time past, as follows: Beams, Angles or Channels, ordinary sizes, 1.73 $\frac{1}{2}$ c. to 1.78 $\frac{1}{2}$ c., carload lots, as a minimum, with the usual addition for smaller quantities.

Bars.—There is a moderately good demand for Bars, but some mills are not able to utilize their full productive capacity. There is rather more inquiry, however, and it is hoped and expected that the requirements of consumers will be larger during the spring and summer months, so that full time will be general, which can hardly be claimed at the present time. Steel Bars at 1.75c. to 1.85c. are strong competitors, but Refined Iron holds its own at 1.93 $\frac{1}{2}$ c. to 1.95c. for carload lots, with the usual addition for smaller quantities.

Sheets.—There is a good demand for Sheets, and mills have made nice additions to their order books during the past week or two. Prices are strong, and in most cases more money has to be paid for the best qualities of Sheets.

Old Material.—There is a steady demand for all kinds of Scrap, but there is no change in prices, although everything is held at moderately full prices. Bids and offers are about as follows for delivery in buyers' yards:

Old Steel Rails.....	\$21.25 to \$21.75
Heavy Steel Scrap.....	20.75 to 21.25
Low Phosphorus Scrap.....	27.00 to 28.00
Old Steel Axles.....	26.00 to 27.00
Old Iron Rails.....	24.50 to 25.00
Old Iron Axles.....	30.00 to 31.00
Old Car Wheels.....	24.50 to 25.00
Choice Scrap, R. R. No. 1 Wrought.....	23.00 to 24.00
Country Scrap.....	21.00 to 22.00
Machinery Scrap.....	20.00 to 21.00
No. 2 Light Scrap.....	18.00 to 19.00
No. 2 Light (Ordinary).....	15.00 to 16.00
Wrought Turnings.....	16.50 to 17.00
Wrought Turnings, Choice Heavy.....	17.50 to 18.00
Cast Borings.....	11.50 to 12.00
Stove Plate.....	15.00 to 16.00

Cincinnati.

FIFTH AND MAIN STS., March 25, 1903.—(By Telegraph.)

Difference of opinion among the prophets as to which way the market is likely to jump in the near future, and continued indifference, both on the part of buyers and sellers, is about all that can be said upon the general Pig Iron situation in the West. The week just closed has been as dull as any of those immediately preceding. Of course there is a small routine selling which ebbs and flows constantly without regard to the general conditions, but beyond this no round lot of Iron is reported as taken by any buyer. It is pretty well understood that furnaces are rather well sold up to July 1, and a number are known to ask for almost nothing except that the market holds steady for the next 60 days, or until they shall have got through with their orders placed at high prices. It is needless to say that this class of producers expect a decline for latter half delivery contracts; others are persistently clinging to the statistical position, which indicates, according to their interpretation, a higher plane of prices than that which now exists. While so far as known there is no No. 2 Southern Foundry openly offering on a lesser base than \$18, Birmingham, yet there are rumors plenty of considerable offering and some selling on as low a basis as \$17.50. There is probably a wider difference regarding values on Gray Forge and like grades than any other spot in the market. The general opinion, however, is that \$17 would be a fair price when quoting, though some holders are asking higher figures and some small selling has been done on a lesser basis. One instance is reported where a seller offered 2000 tons of this grade at \$16.50, Birmingham, which offer was rejected, and met with a counter proposition on the basis of \$16 for the lot. The trade is understood not to have been consummated. One feature in the general situation which is worthy of counting is the fact that Coke is on a much easier basis

than it has been for quite a while. Freight rates from the Hanging Rock district, \$1.15, and from Birmingham to Ohio River points \$3.25. We quote, f.o.b. Cincinnati, for delivery throughout the year, as follows:

Southern Coke, No. 1.....	\$21.75 to \$22.25
Southern Coke, No. 2.....	21.25 to 21.75
Southern Coke, No. 3.....	20.75 to 21.25
Southern Coke, No. 4.....	19.25 to 19.75
Southern Coke, No. 1 Soft.....	21.75 to 22.25
Southern Coke, No. 2 Soft.....	21.25 to 21.75
Southern Coke, Gray Forge.....	18.75 to 19.75
Southern Coke, Mottled.....	18.75 to 19.75
Ohio Silvery, No. 1.....	30.15 to 31.15
Lake Superior Coke, No. 1.....	23.15 to 24.15
Lake Superior Coke, No. 2.....	22.15 to 23.15
Lake Superior Coke, No. 3.....	21.15 to 22.15

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	\$27.25 to \$28.25
Lake Superior Car Wheel and Malleable.....	27.50 to 28.50

Plates and Bars.—There has been no change in the market worthy of notice. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.92c., with half extras; same, small lots, 2.20c., with full extras; Steel Bars, carload lots, 1.73c., with half extras; same, in small lots, 2.20c., with full extras; Plates, $\frac{1}{4}$ -inch, in carload lots, are still nominally 1.70c.; 3-16 inch, 1.80c.; Beams and Channels, 1.70c., base.

Old Material.—We quote dealers' buying prices as follows, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, \$19 per net ton; Cast Scrap, \$17.50 per net ton; Iron Rails, \$22.50 per gross ton; Long Steel Rails, \$22.50 per gross ton; Short Steel Rails, \$17.50 per gross ton; Iron Axles, \$27.50 per net ton; Car Wheels, \$23 per gross ton; Low Phosphorus Steel, \$25 per gross ton. Heavy Melting Steel, \$21.75 per gross ton.

St. Louis.

CHEMICAL BUILDING, March 25, 1903.—(By Telegraph.)

Pig Iron.—The moderate call for quick shipment Iron continues, but the buyers' attitude toward negotiating supplies for the last half is still unchanged. Some relief has come in the matter of shipments, both in the line of Iron and Coke. While some few stray lots of No. 2 Foundry may have been negotiated in this market on an \$18, Birmingham basis, a 50c. higher price is very generally maintained at this time. Steel Irons are said to be the most popular when summing up the present volume of inquiry and actual sales. We quote, f.o.b. St. Louis, as follows:

Southern, No. 1 Foundry.....	\$23.25 to \$23.75
Southern, No. 2 Foundry.....	22.25 to 22.75
Southern, No. 3 Foundry.....	21.75 to 22.25
Southern, No. 4 Foundry.....	21.25 to 21.75
No. 1 Soft.....	22.75 to 23.25
No. 2 Soft.....	22.25 to 22.75
Gray Forge.....	21.25 to 21.75
Southern Car Wheel.....	29.00 to 30.00
Malleable Bessemer.....	24.75 to 25.25
Ohio Silvery, 8 per cent. Silicon.....	33.00 to 33.50
Ohio Strong Softeners, No. 1.....	..... to
Ohio Strong Softeners, No. 2.....	..... to

Bars.—Improvement in the movement of Iron and Steel Bars is manifest, but trade conditions are not showing as much vigor as some of the jobbing interests are inclined to look for and expect at this season. Price conditions continue firm and unchanged since our last report. We quote from the mills Iron Bars at 1.85c. to 1.90c., Steel Bars at 1.85c. to 1.90c., half extras. A quotation of 2.15c., base, is still named by the jobbing trade to their larger local and outside trade. For both Iron and Steel Bars in small lots from store 2.25c. is quoted.

Rails and Track Supplies.—The conditions influencing this department of the market are no exception to those which have been shaping the course of affairs for some time past. The requirements are in such volume that all cannot be handled, and some are therefore being diverted to other sources of supply. Prices are firm for all classes of material in this department.

Angles and Channels.—While spring business has opened up in an encouraging way for Small Angles and Channels, the advancement has not been so rapid as to entirely please some of the jobbers. The price conditions are unchanged, and for material of this class 2.25c. to 2.40c., base, is the range of quotations.

Pig Lead.—Advancement in the general condition of demand and inquiry has continued in the market for Pig Lead. The demand is said to be very heavy, with very little spot delivery in sight. We quote Chemical at 4.57 $\frac{1}{2}$ c. and Desilverized at 4.60c., with an occasional advance over these figures for immediate shipment.

Spelter.—The Spelter market has maintained its improved position, and the volume of demand and inquiry continues to be large and of high order. Metal for quick delivery is much in demand, but the supply seems to be very meager. Prices are firm, and sales are being executed at 5.25c.

Cleveland.

CLEVELAND, OHIO, March 24, 1903.

Iron Ore.—Following the announcement by the mine owners of the prices for Iron Ore during the coming season, the sales were very heavy. The exact amounts would be hard to find just now as the sales are still in progress. The rate situation is complex. The season of navigation is about ready to open, which is a month earlier than was commonly expected. This will enable the Ore carrying fleets owned by the shippers to get at least 1,500,000 tons down the lakes before the other boats start, even if the latter adhere to their determination not to start before May 1. The early opening is undoubtedly favorable to the shippers as far as the rates are concerned, and yet there is nothing to show that they have gained the slightest advantage. Usually at this time some charter has been made, but not an engagement has been reported. The shippers have been looking around for tonnage, but have made no offers. They have insinuated that 85c. between Duluth and Ohio ports, with 75c. from Marquette and 70c. from Escanaba would be very easy for the vessel owners to obtain. The latter have made no offers to handle the material at such prices. They are holding for a basing rate of 90c., and are convinced that they ought to have it. They have formed a quiet combination to compel the shippers to pay the rates they demand. It is likely that nothing will be done until the conference between the longshoremen and the dock managers has concluded. They are in a contention over the rates for unloading Ore by the automatic unloaders, and the men have demanded large increases. This is holding up the work of making contracts. The shipment of Ore from the lake docks to the furnace stock piles continues very brisk, as is indicated by the weekly report of 50,000 tons moved from the Cleveland docks, other ports sending proportionate amounts.

Pig Iron.—The Foundry Iron market has taken a brace which is satisfactory and indicative. Buyers who have been holding off are now in the market making heavy inquiries for the last half of the year, and some of the inquiries have even extended beyond January 1. The tonnage in sight is enormous. The same report of better prospects ahead comes from all sources, and there are the brightest hopes for the future. The buying for the present is of necessity light. The furnaces are making small sales now and then, as they have a lot which has not been contracted for, but these sales are limited. The Southern Ohio and the Alabama furnaces are being drawn upon very largely for what material will be needed for the second quarter. It does not now seem possible that these furnaces should be able to meet all of the requirements for the remainder of the first half, and there is some talk of the consumers being compelled to depend upon foreign furnaces for small amounts. Quotations on Foundry Iron have not changed, being as follows: No. 2, Northern Iron, coming from furnaces in Southern Ohio, \$22, f.o.b. furnace, with a freight of \$1.45 to make up the Cleveland price for spot delivery; and \$21 to \$21.50, Valley furnace, for the same grade for second half delivery. There is a fair call for Basic for second half delivery, and the furnaces, which have not covered their capacity to date, have been considering these inquiries and making quotations. It is understood, however, that one of the furnaces in Cleveland has sold its output for the entire third quarter, and another has sold all of the material it cares to take on contract until well into the fourth quarter. The demand for Iron for spot delivery has been rather brisk, and it is becoming to be a question whether this territory will be able to produce, during the second quarter, all of the material the mills will need. Prices remain as follows: \$21.50 to \$22 for first half delivery, and \$20 for second half delivery. Bessemer producers are inactive for the time being, both for spot delivery and for the future, and prices have not changed from \$21.50 to \$22 for first half delivery and \$20.50 to \$21 for second half. Coke conditions continue to improve slightly, but have not reached a normal stage.

Finished Iron and Steel.—The Bar situation has become more interesting during the past week, and seems to lead the market. A few of the Implement manufacturers through this territory have come in and have bought for the period from July 1 for the ensuing year, but most of them are waiting for the Chicago buyers to give the signal. The Steel product is quoted firmly at 1.60c., Pittsburgh, for Bessemer, and 1.70c. for Open Hearth. There is little being done in Bar Iron. The cost of the raw material is high, and the mills are therefore getting what prices they can. One of the dealers, in quoting for the mill, makes the price 1.80c., Youngstown, while the general quotation is about 1.85c., although one producer is quoting 1.90c., and seems to be getting all the business he cares to take. The Structural trade is not quite so brisk as it has been. There is no more premium business, but all of the material that is sold now goes at the association price of 1.60c., Pittsburgh. The jobbers, of course, are getting a little business at 2.25c., as the maximum Cleveland. The Plate trade remains very strong. The larger mills are naming 1.60c., Pittsburgh, the smaller makers 2c. at the mills and the jobbers are getting pre-

miums over this price. The Sheet market has been stronger. The selling for the second half has been brisk, and buyers are even making contracts into the first quarter of next year. Prices have not changed, being 3.10c. to 3.25c. for No. 27 out of stock, Black Sheets, and 2.85c. to 2.95c. for the same gauge at the mills. There have been a few sales of Rails, but the big tonnage that has been in sight, coming from the promoters of electric lines, has not been closed. The prices are still \$28 for contracts over 500 tons, based on Pittsburgh, and \$30 for orders of 500 tons and less. The call for Light Rails is still heavy, with the price holding at \$36, Pittsburgh.

Old Material.—The Scrap trade has been steady and the market firm with upward tendencies. The dealers who have been oversold are still trying to meet their engagements, and are buying material at prices equal to if not greater than the selling price. Prices remain unchanged as follows: No. 1 Wrought, \$19.50, net; Iron Rails, \$25.50, gross; Iron Axles, \$27.50, net; Wrought Turnings, \$14.50, net; Cast Borings, \$12, gross; Car Wheels, \$22.50, gross; Heavy Melting Steel, \$20.50, gross; Old Steel Rails, \$21, gross.

Birmingham.

BIRMINGHAM, ALA., March 23, 1903.

A majority of the interests report the market very quiet, which means that transactions were limited. Yet your correspondent finds that a very fair business was transacted, which in volume will compare very favorably with the average run of business of late. Some interests being practically sold up have had but little to offer, and some have had nothing to offer. But there are others who have enjoyed good inquiries and have registered respectable business. One interest informs your correspondent that their inquiries for the week will aggregate 35,000 tons, of which 25,000 tons were for delivery the last half of the year, and that they came from the largest buying interests in the trade. But there is an absence of snap to the trade. If the market had any snappish qualities it would be impossible to hold it on a level keel.

For cash and nearby deliveries values are still quoted on a basis of \$18.50 for No. 2 Foundry, and there were sales of that grade at that price. There were also sales at \$18.25, net, for both No. 2 Foundry and No. 2 Soft. There were also sales at \$18.25, regular, and also at \$18; the deliveries extending into the last half of the year and covering the greater part of it. But there were no large transactions. Some No. 1 Soft sold at \$19, and some at \$19.50. No. 3 Foundry is quoted at \$18, with sales of small magnitude, and a few were made at \$17.75. No. 4 Foundry is quoted at \$17.50, and from some interests you cannot buy it for less, but there was one sale of a mixed lot of Gray Forge and No. 4 Foundry that went to an Eastern point at \$16.50, the deliveries extending into the last half of the year. There are some interests that refuse any price under \$17.50 for Gray Forge. A small spurt in buying would speedily absorb what can be had of this grade in this district. There were reports of large transactions in Basic Iron current in Iron circles, as well as reports of large sales of Steel Rails. But investigation developed the fact that while there were good inquiries for both there were no sales of either.

The Steel mill will be in position some time in April to commence running regularly on Rails. Machinery that the mill has been waiting for is now arriving and being placed in position, and when it is installed the Tennessee Coal, Iron & Railroad Company will be on the market for business. Some of the Rails turned out some time ago are in use on roads here, in positions selected to test their quality and their wearing properties. So far the test has been very satisfactory, and the quality of the Rails pronounced equal to the best. The management is full of faith as to the ability of the mill to produce a superior quality of Rail.

Iron was made last week under "slow bells" at the furnaces, conditions having altered but little from those described the preceding week. But the prospects are good for a gradual improvement from now on, and we may anticipate better results. The Republic Company, at Thomas, will on April 1 commence the improvement of their Furnace No. 2, rehabilitating it and increasing its capacity. When that is finished, their No. 1 Furnace will undergo the same overhauling. At Ensley preparations are about completed to commence the improvements there, of which mention has been made. The weather has been against much headway in this kind of work, and has delayed seriously all efforts of this kind. But it is well enough in hand now to justify the assertion that there will be a material addition to our capacity available with the advent of summer, and before it is ended Gadsden will have a completed furnace in commission and the others under way. There are also others in process of incubation; but all the eggs under a setting hen don't always hatch out. There can be no question that projects are on foot looking to an increased development of the resources of the district and the utilization of the advantages it offers. There has been an increasing inquiry of late as to desirable investments in Coal and mineral properties from sources that controlled the capital necessary for large enter-

prises, and investigation is being made of inviting propositions. But you can't buy tempting offers now for a song. The Panama Canal has caused increased confidence in the value of property that has merit to commend it.

Several large companies filed the past week their articles of incorporation. Among them were the Sayre Mining & Mfg. Company, the incorporators being Robert Sayre of Pennsylvania and James Weisel, John Adams, J. F. Webb, all local parties. The company are capitalized at \$150,000, with authority to increase it to \$1,000,000. They have the usual liberal charter, and will mine Iron and Coal and may build furnaces or other Iron works. The Jefferson Coal & Coke Company, capitalized at \$200,000, own valuable Coal lands in the counties of Jefferson, Walker and Blount. Their headquarters will be here. The Seloca Coal Company, capitalized at \$50,000, will do a general mining business. These additions to our enterprises' capacity would not be made unless the outlook for ready markets was encouraging.

The Tutwiler Coal & Iron Company are erecting a battery of Coke ovens on Short Creek, where they are opening up Coal mines. The brick work on about 50 ovens is completed, and more will be erected as the output of Coal is increased until they number at least 250.

The action of the Galloway Coal Company in increasing the wages of their miners 10 per cent. is of general interest. The property of this company is situated in Walker County, and their miners do not belong to the order of United Mine Workers, but are members of the Knights of Labor. Their years runs from April to April. The wages paid by this company have been on an equalized basis with wages of this vicinity, and heretofore the miners received 50c. per ton, while those here received 55c. This action fixes an increase of at least 10 per cent. here when the scale is presented at the annual meeting in July.

The markets for both Coal and Coke continue good. There is no diminution in the demand and none in the price. Coke for prompt and nearby delivery still brings \$6 and \$6.25, while Coal depends upon so many conditions that each sale is governed by them. There is no uniformity in prices. As to cars, there is also a diversity as to the conditions. There are a fortunate few who have no complaints to make, but there are more than a few afflicted with lamentations. One of the latter said to the writer: "We shipped some Iron in January to the Central West, and it has not yet arrived at its destination. But we are not complaining. We are tired out at that business, and there is no profit to us in it." There is a large tonnage at the various terminals of the initial lines which has to wait its turn in the slow process of unloading and reloading before it can resume its travels to destination.

Mention was made last week of activity in railroad circles. Since then there has been published a list of the roads being built and extended, covering the names of 17 different roads. A few of them are new roads, and some of them are in connection with established industries.

Pittsburgh.

(By Telegraph.)

PARK BUILDING, March 25, 1903.

Pig Iron.—Reports are again current of a proposed consolidation of some independent blast furnaces in the Mahoning and Shenango valleys, backed by some of the stronger outside Ore interests. Only small lots of metal are being sold, but the market is very strong. Bessemer Iron for delivery over next three or four months is \$21, at furnace, third quarter Iron is about \$20.50, at furnace, while for shipment over last six months \$20, at furnace, is quoted. Basic Iron is in good demand and brings about the same prices as Bessemer. Forge Iron is firm and Northern brands bring \$21 to \$21.25, Pittsburgh. Southern and Virginia brands of Forge are offered at \$20.50 to \$20.75, Pittsburgh.

Steel.—Very little Steel is being offered, and the market is very firm. Bessemer Billets in small lots are held at \$31 to \$31.50, and Open Hearth, ordinary carbons, at \$31.50 to \$32, Pittsburgh. The foreign market on Steel is very much better and prices are now so high on the other side as to practically shut foreign Steel out of this market.

(By Mail.)

There are no special features to note in the Iron trade this week. Demand for material of all kinds continues large and prices are firm. There seems to be no doubt whatever but that present conditions are going to last all through this year. It is the general belief in the Iron trade here that negotiations have been closed for the purchase of the Clairton Steel Company blast furnaces and open hearth works, and the Jones & Laughlin Steel Company, by the United States Steel Corporation, and that an opportune time is being awaited to make announcement of the taking over of these two concerns. The officials of both companies refuse to confirm or deny the reports.

Structural Material.—The American Bridge Company are importing men into this city to take the place of strikers, and already have quite a large force at work on the Wash bridge, work on which was hung up by the strike. No large contracts have recently been placed, but enough work has been booked and is in sight to keep the Structural mills filled up for months to come. Prices are as follows: Beams and Channels up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c. to 1.85c.

Hoops and Bands.—We note that a very heavy tonnage in Hoops, Bands and Cotton Ties is being placed, and the three leading concerns in these lines of manufacture are well sold up for the next several months. Sales of Cotton Ties have been especially heavy. We quote Cotton Ties at 88c. in 5000 bundle lots and over, and 91c. for less quantities, f.o.b. mill. Steel Hoops are 1.90c. for 250-ton lots or over, and 2c. in small lots, full extras. Bessemer brands are 1.60c. up to No. 12 gauge, and Open Hearth 1.70c., f.o.b. mill, extras as per Steel Card.

Ferromanganese.—We continue to quote English Ferro at \$50 in 250-ton lots and over, and \$52.50 for carloads and smaller lots delivered at buyer's mill. We note a sale of about 25 tons of English Ferro at \$52, delivered. German Ferro is offered at slightly lower prices.

Muck Bar.—The market on Muck Bar is extremely firm and \$35, Pittsburgh, is minimum for domestic brands, some sellers quoting \$36, and holding firm for that price. We note a sale of 300 tons of domestic Muck Bar at \$35, delivered. Eastern Muck Bar is offered at \$34, delivered here.

Steel Rails.—We note that a large order for an extreme Western railroad is in the market, but may go abroad as domestic mills will hardly be able to make deliveries wanted. Only moderate lots are being placed, and the mills are turning out a heavy output and making good deliveries. We quote at \$28, at mill in 500-ton lots and over, \$29 in carloads and \$30 in small lots for Standard Sections.

Tin Plate.—Demand for Tin Plate continues heavy, and we are advised that some of the outside mills are able to get from 10c. to 20c. per box higher prices than are quoted by the leading interest. Ordinary Terne Plates are held at \$3.80, Pittsburgh, with the usual advance in special grades. We understand that the American Tin Plate Company are operating practically all of their mills to full capacity, and have sent out a circular letter to the trade, offering to sell Tin Plate at present prices up to July 31 next.

Plates.—Demand for Plates is heavy and it is something of a mystery to those in the trade where the enormous tonnage of Plates that is being made is used. The larger Plate mills are practically filled up for the rest of this year and are turning down nice orders every day. Buyers who want Plates for prompt shipment are having trouble in finding mills that will accept such orders. The situation could not be stronger, but there is no intimation of any advance in prices. Car and boat builders are placing heavy tonnage, the Steel Car business alone consumes at least 2500 to 3000 tons of plates per day. For spot shipment Plates command from 1.75c. up to 2c., at mill. Official prices for indefinite deliveries are as follows: Tank Plate, 1/4-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in prices to 3c. Plates more than 100 inches wide, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, \$2 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Sheets.—The improvement noted in the Sheet market in our last report continues, and the tone of the market is very much stronger and demand is somewhat better. While no actual advance in prices of Sheets has been made, some concessions have been withdrawn and the market is firmer than for a long time. It is understood that the independent Sheet mills are going ahead with their project of consolidation, with good prospects of success. We quote Black Sheets as follows: Nos. 22 and 24, box annealed, one pass through cold rolls, 2.45c.; No. 26, 2.55c.; No. 27, 2.65c., and No. 28, 2.75c. These prices are for carloads and larger lots and are minimum of the market, jobbers charging the usual advances for small lots. Galvanized Sheets are now 75 and 10 off, which is equal to 3.60c. for No. 27 and 3.85c. for No. 28. These prices are for carloads and larger lots, and are f.o.b. at mill.

Rods.—There is a good inquiry for Rods, and as supply is limited prices are firm and are higher than for some time. Ordinary Bessemer Rods are now held at \$37 to \$37.50, and Open Hearth Rods, \$38 to \$39, maker's mill.

Spelter.—Prices of Spelter continue to advance, and it is scarce. Prime Western grades for future delivery are held at 5.30c., St. Louis, equal to 5.43 1/2c., Pittsburgh. Futures are held at 5.30c., St. Louis, or 5.43 1/2c., Pittsburgh.

Iron and Steel Bars.—Tonnage in both Iron and Steel

Bars is heavy, especially for Iron, and some of the mills rolling the latter have advanced their prices. The mills rolling Steel Bars are pretty comfortably filled, but could probably take care of more business, if they had it. We quote Iron Bars at 1.89 $\frac{1}{4}$ c., Pittsburgh, in carload lots and 1.95c. in small lots, half extras, as per National card. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.50c. per lb. extra, the total weight of a size to determine the extra regardless of length.

Merchant Pipe.—The Pipe market continues very satisfactory, demand being heavy and prices firmer than for a long time. The mills have a large tonnage entered, and some of them are practically sold up for the next three months or longer. On the larger sizes of Pipe, 7 to 12 inches, some of the mills are sold up into the fall. Discounts in carloads to consumers are as follows:

	Merchant Pipe, Full weight				Full weight			
	Merchant Pipe, Steel.	Wrought Iron.	Blk. Galv.	Blk. Galv.	Steel Pipe.	Wrought Iron.	Blk. Galv.	Blk. Galv.
1 $\frac{1}{2}$, 1 $\frac{3}{4}$ and 2.....	68	58	65	55	67	57	64	54
2 $\frac{1}{2}$ to 6.....	70	60	67	57	69	59	66	56
7 to 12.....	75	65	72	62	74	64	71	61
13 to 18.....	80	70	77	67	79	69	76	66

Skelp.—The market on Skelp is exceedingly firm, and all the mills are well sold up for the next three months. It is said that the leading maker of Skelp will not book any more business for delivery before July next. We quote Grooved Iron and Steel Skelp at 2.05c. and Sheared at 2.10c. to 2.12 $\frac{1}{2}$ c., Pittsburgh, or 2 per cent. off for cash in 30 days.

Boiler Tubes.—There is a good demand for Boiler Tubes, and specifications on contracts placed some time since are coming in very freely. Prices are firm, and Pittsburgh basing discounts in carloads, 22 feet and under, to consumers, are as follows:

Size.	Steel.	Iron.
1 to 1 $\frac{1}{2}$ inches inclusive.....	42 $\frac{1}{2}$	36 $\frac{1}{2}$
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ inches inclusive.....	55 $\frac{1}{2}$	35 $\frac{1}{2}$
2 $\frac{1}{2}$ to 5 inches inclusive.....	61	45 $\frac{1}{2}$
6 to 13 inches inclusive.....	55 $\frac{1}{2}$	35 $\frac{1}{2}$

Connellsville Coke.—The car situation continues to improve, and shipments of Coke last week out of both Connellsville regions were larger than for a long time. It is believed that the supply of cars and motive power will steadily increase from this time forward. Last week the Upper and Lower Connellsville regions turned out nearly 300,000 tons, a considerable gain over the previous week. Contracts for strictly Connellsville Furnace Coke for shipment over the last six months are being made at \$3.75 to \$4 a ton, at oven; 72-hour Foundry Coke brings \$5 a ton, at oven, on contracts. Furnace Coke for prompt shipment brings \$5 or more, and Foundry Coke, \$6.50 to \$7 a ton, at oven.

Old Material.—There is an active demand for Iron and Steel Scrap, and some lines are exceedingly scarce and higher in price. Consumption of Scrap has never been as heavy before as it is at the present time, and the outlook is that some lines may be higher. We quote Heavy Steel Melting Stock, \$21.50, gross tons; No. 1 Pipe and Tank Iron, \$18 to \$18.25, net tons; Cast Iron Borings, \$11.75 to \$12, gross tons; No. 1 Cast Scrap, \$20.75 to \$21, gross tons; No. 1 Wrought Scrap, \$21, net tons; Iron Axles, \$30 to \$30.50, gross tons; Steel Axles, \$26 to \$26.50, gross tons; Old Car Wheels, \$24 to \$24.50, gross tons. We note a sale of 100 tons of Cast Iron Borings at \$11.75, in gross tons, f.o.b. Pittsburgh.

The Emlyn Iron Works.—At a meeting of the stockholders of the Emlyn Iron Works, Chicago, March 20, the following Board of Directors was elected: S. Morris, R. Ruddell, George F. Davies, Geo. M. Bard and George M. Stewart. Subsequently the Board of Directors organized by the election of the following officers: George M. Bard, president; Geo. F. Davies, vice-president and treasurer; Geo. M. Stewart, secretary. C. H. Hawkins was re-elected general sales agent. The Emlyn mill, which has been idle for some months, is being improved and will probably be in operation on April 1. Plans are being prepared by which at least \$25,000 will be expended in further improvements in materially increasing the capacity of the works.

The McKeesport Tin Plate Company.—PITTSBURGH, PA., March 25, 1903.—The McKeesport Tin Plate Company, Frick Building, Pittsburgh, Pa., have partially started their new tin plate plant at McKeesport, Pa. The plant contains ten tin mills, of which five have been started and the other five will be placed in operation within two weeks. The hot mill building is 360 x 100 feet and the cold rolling and annealing department is 360 x 75 feet. The tin house contains 19 tinning sets, and with the assorting room is contained in a building 630 x 60 feet.

Belgian Iron Market.

BRUSSELS, March 3, 1903.

The Belgian Iron industry has not recently been able to maintain the animation which developed earlier in the year. The cause must not alone be sought in a check in the demand, but is due principally to the manipulations of middlemen. These in December had concluded with the rolling mills contracts for one, two and three months' delivery at exceedingly low prices. Since it was necessary that they put in their specifications before January 31 and February 15 under penalty of paying an advance of several shillings per ton they offered Bars on the London market at prices which were considerably lower than the quotations of the rolling mills, although higher than those at which they themselves had contracted for. This caused uncertainty among buyers and prices could not rise further. They have, therefore, remained stationary, and the only hope is that when these contracts have been cleared out of the way the approach of spring will bring about a more satisfactory and more rapid development of the markets.

Pig Iron is firmly held, Forge selling at 57 to 58 francs, Foundry Iron at 60 francs, Thomas Pig at 64 francs and Spiegeleisen, with 6 to 8 per cent. Manganese, 78 to 80 francs. Steel Billets, &c., are not purchased from Belgian steel works, because the latter convert them themselves into finished products. The rolling mills secure their supply advantageously from the Steel works of Lorraine and the Grand Duchy of Luxemburg at 86 francs for Ingots, 95 francs for Blooms and Slabs and 100 francs for Billets.

In Finished products the works have a good deal of employment. Unfortunately the greater part of the capacity is contracted for at very low prices. Thus in Beams for which the export price is now £4 12s., few orders are on the books at that price, but an enormous quantity at £4 10s., £4 8s., £4 4s. and even £4 2s. Our home market has taken considerable quantities of Beams, the building having already begun. Besides the season promises to be good, and manufacturers are very prudent about entering into engagements. Merchant Bars, Iron and Steel, are being purchased in considerable quantities for Japan and British India. There is no haggling now over the price of £5 2s. for Iron Bars, and new business is not placed below this figure at the present time. Steel Bars are quoted £5 4s. For our home market the prices are 135 francs both for Iron and Steel. Rails are selling at £4 14s., and it would be possible to secure £4 16s., if it were not for the extraordinary competition of some of the large German Steel works, whose cost of production is low and who refuse to raise their prices in order to get rid of their enormous production.

The Plate mills, although they have a little more work, continue to complain. Tank Plates are £6, while Iron Plates are now from £5 15s. to £5 19s., f.o.b. Antwerp. In the Wire business the situation has improved a little, because orders are less scarce, but prices are not rising sufficiently. At the present time 132.50 francs per ton, f.o.b. Antwerp, is secured for No. 2 Iron Rods, and 145 francs for Steel Rods, prices which bear no relation to those of Pig Iron and of Steel. The Nail mills are enjoying fairly good trade. The manufacturers of Chains, &c., still complain that they have less orders than have been received in other years at a similar time, and the future does not seem bright to them.

Below we submit some statistics of quotations of the Iron trade of Belgium for 1902 and the preceding nine years:

Production of Pig Iron—Metric Tons.

1893.....	745,264	1898.....	979,755
1894.....	818,597	1899.....	1,024,576
1895.....	829,234	1900.....	1,018,561
1896.....	959,414	1901.....	764,270
1897.....	1,035,037	1902.....	1,069,210

The increase is marked as will be observed, the year 1902 having brought out the record production of Pig Iron in Belgium.

The following table summarizes the production, imports and exports and apparent home consumption of Belgium during the years 1900, 1901 and 1902:

Pig Iron Statistics for Belgium—Metric Tons.

	1902.	1901.	1900.
Production	1,069,210	764,270	1,018,561
Imports	291,611	165,766	305,668
Totals	1,360,821	930,036	1,324,229
Exports	34,366	16,265	8,252
Apparent home consumption.....	1,326,455	913,771	1,315,977

Our consumption of Pig Iron has therefore been pretty closely the same in 1902 as it was in 1900. The production of intermediate products, Steel and Muck Bars, was as follows:

Production of Intermediate Products—Metric Tons.

1893.....	273,113	1898.....	653,523
1894.....	405,661	1899.....	731,249
1895.....	434,619	1900.....	635,199
1896.....	598,974	1901.....	526,720
1897.....	616,541	1902.....	776,875

Here, too, was a drop in 1901 and a recovery in 1902. The apparent home consumption is figured out as follows:

Statistics of Intermediate Products—Metric Tons.

	1902.	1901.	1900.
Production	776,875	526,720	655,199
Imports	103,286	68,228	19,705
Totals	880,161	594,948	674,904
Exports	1,464	290	975
Consumption	878,697	594,658	673,929

In spite of the enormous growth of our production it has not sufficed for our requirements, and our importations have therefore increased considerably. The output of Finished Iron and Steel in recent years has been as follows:

Production of Finished Iron and Steel—Metric Tons.

	Iron.	Steel.	Total.
1893.....	485,021	224,922	709,943
1894.....	453,290	341,318	794,608
1895.....	445,899	367,947	813,846
1896.....	494,032	519,311	1,013,343
1897.....	474,819	527,617	1,002,436
1898.....	485,040	567,728	1,052,768
1899.....	475,198	633,950	1,109,148
1900.....	358,163	568,539	926,702
1901.....	384,325	510,805	895,130
1902.....	377,910	755,880	1,133,790

Here again a record production has been reached, due, however, entirely to the development of Steel. The home consumption is figured as follows:

Home Consumption of Finished Iron and Steel—Metric Tons.

	1902.	1901.	1900.
Production	1,133,790	895,130	926,702
Imports	78,619	80,336	79,690
Totals	1,212,409	975,466	1,006,392
Exports	601,344	476,085	419,723
Apparent home consumption.	611,065	499,381	586,669

Our exports and our consumption therefore have increased notably, while our imports have remained at about the same level. During 1902 we exported 53 per cent. of our product, as against 55 per cent. in 1901. The proportion would evidently be greater still if account were taken not alone of the rolled products exported as such, but also those which leave the country after having been worked further into such articles as Nails, Forgings, Machinery, &c. It is generally considered that our exports absorb very nearly 80 per cent. of our production.

French Iron Market.

PARIS, March 3, 1903.

The French Iron market has slightly improved since our last report. After long and laborious negotiations the Plate Syndicate has been renewed. At a meeting of the Beam Syndicate on February 20 the rolling mills which form a part of it have agreed on the principal lines for its reconstruction. Therefore a continuance of this syndicate for the next five years from July 1 may be regarded as settled. One of the principal works seemed little disposed to conclude a new contract, because the opinion was held that it was necessary by all possible means, even by making the lowest prices, to encourage the consumption of Beams in competition with cement in the large cities and with timber in the provinces. The syndicate has agreed to this view of the case. The conclusion may be drawn that, although the inevitable consequence of the dissolution of the syndicate would have been a low range of values, there is still very little chance of a rise in prices. They are now dragging along on the basis of 17 francs. Generally speaking, it is a difficult matter to give exact quotations. Some prices are firmly held by one works, although dealers and builders are urged to buy at lower prices by some other company.

The amount of work is rather better than it has been for the rolling mills, but confidence is very slow in returning. In the month of January the following statistics developed in the Iron trade: The imports of Pig Iron under the drawback system have declined to 8750 tons and the imports for consumption have fallen to 1520 tons, as compared with 2230 tons in January, 1902. Exports have risen close to 20,000 tons. This shows how our blast furnaces have succeeded in profiting from the increasing prices brought, particularly in Belgium, in order to get rid of their stocks. The accumulations of the Longwy Syndicate are not more than 60,000 tons and the stocks of the outside furnaces 50,000 tons. This is about one-half of what they carried during the most serious part of the crisis. There is nothing extraordinary in this stock, since it must be considered that it constitutes the only reserve of the entire French metallurgical industry, the works which convert the Iron not having any supply. There is nothing surprising, therefore, in the fact that additional furnaces have been blown in by M. Raty and by the Micheville Steel Works.

As for Bars, imports under the drawback clauses have amounted to 1630 tons in January, as compared with 337 tons in January, 1902. This seems to show that our large Bolt works, &c., have turned to the import trade, and that they are doing a considerable business in this direction.

The Sheet mills are having a good deal of difficulty; the Loubroil Mill has shut down completely on the first of this month.

The exports of Steel have increased considerably, having been 9000 tons of Ingots and Billets, as compared with 2000 tons in January, 1902.

Prices are as follows: Iron Merchant Bars are selling at 15 francs in the Northern Department and in the Meurthe et Moselle. In Paris they fluctuate between 15.50 and 16 francs. In the Haute Marne 16.50, and even 17 francs are obtained, while in the Loire and in the center of France prices generally are from 18 to 18.50 francs. In Sheets the base price of the rolling mills of the North remains at 17.50 francs; in the Haute Marne district the situation is a little better, and 19.50 francs is being quoted. In the Meurthe et Moselle Steel Sheets are fetching 18 francs.

Representatives of all the Bolt works of the Ardennes, of the North and of the Loire have recently held a meeting at Paris. A pretty lively discussion was brought out on the subject of discounts granted by certain shops in order to obtain the greater part of current orders. An agreement was reached to work against the tendency to these disastrous conditions and to maintain prices at a reasonable spread above the cost of production.

The car works have received some important orders. In a letting of 2350 cars for the Spanish railroads the Dyle-Bacalan Works have secured 150; Havre St. Pierre 700 and the St. Denis Works 800. The rest went to Belgian works. Other important lettings are in sight. The North of Spain Railroad has allotted 10,000,000 of pesetas for the purchase of locomotives and cars. The Siam roads will increase their rolling stock and the Mediterranean-Italian Road is going to put out 300 cars and 60 locomotives.

The shipyards expect a good deal of work. The budget for 1903 includes several armored cruisers, torpedo chasers and submarine boats. The total is expected to be more than 200,000,000 francs.

The principal event of the present time is the consolidation of the Vezin Aulnoye Works with the St. Chamond Company.

German Iron Market.

ESSEN, March 6, 1903.

In the majority of branches of the German Iron and Steel markets a more confident feeling has developed since our last report. Large quantities of Pig Iron and Billets are being taken by America, and the demand from home sources has also increased considerably with the return of confidence. Prices are still little advantageous in spite of some advances, and it is only the large works supplied with their own raw materials who can count on any profit at all while the other plants are happy if they reach their own costs. The latter view the future with very much less confidence than the large works, who are able to utilize the advantages of the moment fully.

The Siegen Iron Ore mines have been able to sell almost the entire production for the first six months of this year, and are about to resume full operations. The price of Raw Spathic Ore has remained unchanged at 10.40 marks, and with the Calcined Spar at 14 marks per ton, f.o.b. Siegen. Nassau Red Hematite, which was temporarily sold at lower prices in order to clear away stocks, is again quoted at 10 marks per ton for 50 per cent. Iron contents. From the northern part of the Gellivara district a coarse Magnetite with higher phosphorus contents is now obtained, a matter desirable to the furnaces running on basic Bessemer Pig, because they can avoid purchasing puddle cinder, which has been steadily increasing in cost.

In Pig Iron America continues to appear as the purchaser of large blocks. Thus there is now in hand an inquiry for 25,000 tons of Foundry Iron and 25,000 tons of Basic Pig, besides a number of smaller inquiries. Lately considerably higher prices are being demanded for shipments to America. The blast furnaces have satisfactory employment throughout, and in January the production was the greatest since the establishment of the syndicate. Besides this the fact must be noted that stocks at the works have declined considerably. They have fallen from about 500,000 tons at the beginning of last year to about one-half that quantity. Prices for Pig Iron for the home market have remained practically unchanged.

The Steel Syndicate decided at its last session to maintain present prices for the second quarter, and also to accord the export bounty at the figure granted hitherto. Since then the home market has become notably more active, and a number of buyers who could not decide upon purchases for May have now bought for the first half. The home market prices are as follows: Ingots and Heavy Blooms, 77.50 marks; Ordinary Blooms and Heavy Billets, 82.50 marks. Ordinary Billets of 15 mm. square, 90 marks, and Slabs, 92.50 marks.

The efforts to create a general German Steel Works Syndicate continue. At the invitation of C. Lueg and A. Kirdorf, a meeting took place at Düsseldorf last week of the representatives of German Steel works. The proceedings were limited to a general presentation of opinions as to the aim to be pursued and to debates on proposals submitted by different parties. A commission, consisting of 12 mem-

bers, was appointed to decide the fundamental questions. Among these are the distribution of percentages, the question as to the organization of rolling mills, or the Steel Syndicate itself and many others which caused a collapse of the former movement to establish a German Steel Syndicate. The debate showed that the leaders of the great works agree to the formation of an association. In these circles the efforts to bring it about are not regarded as hopeless. On the other hand, there are many manufacturers who are skeptical and who believe that the obstacles to the formation of a syndicate are very serious.

The old cheap contracts which were made several months since with dealers continue to press upon the market, and it is probable that it will take some time before it is possible to secure any general improvement in the prices. Aside from the sales made by dealers the mills quote 107 to 110 marks for Bars and Light Shapes and 120 marks for Iron Rivet Rods. Business in Hoops and Bands is active, but the higher prices aimed at—122.50 to 125 marks—cannot be generally put through. At the last meeting of the German Beam Syndicate the fact was established that the volume of business is good for this season of the year. For further sales recent prices and conditions are maintained. The market has become more active in Gas Pipe, orders are coming in more freely, and specifications are entered well. Even in the Boiler Tubes there is more life. Prices are unchanged and the export movement is very difficult. Skelp is also more active, even though the amount of business is far removed from the normal rate. Steel Skelp for Boiler Tubes is quoted according to width, 118 to 121 marks, while Iron is quoted 155 marks for first quality and 145 marks for second quality. The plate market is weak, while business in Sheets has increased considerably. The base price for Sheets is 137.50 marks, dealers securing discounts according to the volume of business. The Rail mills are exceedingly well employed, and are receiving further large quantities for export. Prices are 100 to 102.50 marks for Light Rails and Mine Rails and 135 to 140 marks for Girder Rails.

The Wire market has shown further activity, and in Wire Rods some export orders have come in at fair prices. The home market for Wire Rods is unchanged at 120 marks per ton. The works are fairly well employed.

In the machinery trade work is increasing gradually, and it is particularly the shops who build gas engines who have a good deal to do. Locomotive and car shops have recently received somewhat larger orders from the State roads.

New York.

NEW YORK, March 25, 1903.

Pig Iron.—The local Pig Iron market is quiet, and importers are doing little in the way of additional purchases abroad for shipment here. There is one inquiry in the market for 10,000 tons from a Cast Iron Pipe company, on which importers are bidding. As yet it has not been closed. The Spiegeleisen market has been unsettled since the last important sale, at which about 15,000 tons of foreign Spiegeleisen was placed with a large Steel works at the reported price of \$25.50, Baltimore. Quite recently a lot of upward of 1500 tons of foreign Ferromanganese was also sold at a shade under \$49, delivered. We quote, at tidewater, for prompt to early delivery: Northern Iron, \$23.50 to \$24.50; No. 2 Foundry, \$22 to \$22.25; No. 2 Plain, \$21.25 to \$21.50; Tennessee and Alabama brands, in New York and vicinity, No. 1 Foundry, \$23.50 to \$24.50; No. 2 Foundry, \$22.50 to \$22.75; No. 3 Foundry, \$21.50 to \$22.

Steel Rails.—The total of the orders for 1903 delivery booked by the mills now aggregates close to 2,500,000 tons, of which, of course, a considerable quantity has already been rolled. Some of the mills are now booked full to the end of the year. Others still have tonnage available for the latter part of the year. Current business is light. We continue to quote \$28 for Standard Sections, Eastern mill, in large lots.

Cast Iron Pipe.—While no large contracts are in immediate prospect in this section, the demand for small lots continues fully as good as at any time this spring. The Eastern foundries are steadily adding to the contracts on their books and covering their capacity further into the summer. Competition for new business is therefore diminishing and manufacturers are only bidding on such work as seems to them particularly desirable. On the Perth Amboy order for 1600 tons of 24-inch Pipe, the lowest bid received was \$28.80. Manufacturers continue to quote \$35.50, gross ton, for carload lots of 6 to 12 inch, at tidewater.

Finished Iron and Steel.—The feature of the week has been the readjustment of Eastern prices on Plates to bring them more closely to the prices quoted by Western mills. The Eastern price has been steadily held at 2c., at mill, since May until within the past month. Western manufacturers have recently been quoting more extensively in this territory, and it has finally become expedient for the Eastern manufacturers to modify their prices. While it is possible that it may be necessary in some cases to get down to the actual Pittsburgh level, which is 1.78c. at tidewater, it is

stated that thus far it has not been found essential to make this a general price. The volume of business is exceedingly good, and the Eastern mills enjoy an advantage in respect to delivery. The demand has improved with the settlement of the labor troubles in the local shipyards and boiler shops. The Eastern Bar Iron Association met in this city last Thursday and decided after full discussion to make no change in prices. The American Bridge Company have secured the contract for the erection of the Merchants' Exchange Building at San Francisco, which will require about 4500 tons of Steel. This is quite a large building for the Pacific Coast to undertake. A great deal of similar business is expected to develop not only on the Pacific Coast, but all over the section west of the Mississippi River. This is partly due to the prosperous conditions prevailing in that territory, and partly to the fact that the price of Steel has not kept pace with the advanced cost of other building materials. The strike with which the company have been contending is practically over, as operations are proceeding on all their work at other points except in this city. General conditions are exceedingly favorable for a great deal of structural work, not only in the large Eastern cities but also in the smaller towns. Among the important matters which will shortly develop are the buildings which will be erected when the building programme of the United States Steel Corporation is entered upon actively. We quote at tidewater as follows: Beams, Channels and Zees, 1.75c. to 2c.; Angles, 1.75c. to 2c.; Tees, 1.80c. to 2c.; Bulb Angles and Deck Beams, 1.90c. to 2.25c. Sheared Steel Plates are 1.85c. to 2c. for Tank, 1.95c. for Flange, 2.05c. for Marine and 2.25c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.75c. to 1.90c. Foreign Beams are 1.72½c. in large lots.

Old Material.—The volume of business is quite satisfactory, but with no special feature developed during the past week. From present indications the stock of ordinary grades of Old Material is sufficient to supply the requirements of the trade, and conditions are healthy. Those who have material to sell are able to find buyers, and those seeking stock are able to secure it without great difficulty. We quote, f.o.b. cars, vicinity New York, per gross ton, as follows:

Old Iron Rails.....	\$24.50 to \$25.00
Old Steel Rails, long lengths.....	21.00 to 21.50
Old Steel Rails, short pieces.....	19.00 to 19.25
Relaying Rails, heavy sections.....	29.00 to 30.00
Relaying Rails, lighter sections.....	31.50 to 32.00
Old Car Wheels.....	24.00 to 25.00
Old Iron Axles.....	30.50 to 31.00
Old Steel Car Axles.....	25.50 to 26.50
Heavy Melting Steel Scrap.....	19.00 to 19.25
No. 1 Railroad Wrought Scrap Iron.....	22.50 to 23.50
Iron Track Scrap.....	19.50 to 20.50
Wrought Pipe.....	15.50 to 16.50
Ordinary Light Iron.....	11.00 to 12.00
No. 1 Machinery Cast Scrap.....	19.00 to 20.00
Stove Plate.....	14.00 to 15.00
Wrought Turnings, delivered at mill.....	17.00 to 18.00
Cast Borings, delivered at mill.....	11.00 to 12.00

Metal Market.

NEW YORK, March 25, 1903.

Pig Tin.—Pending the result of the Banca sale, which is scheduled for to-morrow, the market has been very quiet. In absence of the speculative support, prices have receded steadily throughout the week. When the market in London threatened to fall rapidly a little prop was placed under it, but otherwise it was less sensational than for several weeks past. As far as consumers were concerned, buying was of the slightest order. At the close to-day spot to June was quoted 29.25c. to 29.75c. The London market reached its lowest point on the 19th inst., when £133 5s. was the figure. To-day the closing cable named £134 7s. 6d. and £134 17s. 6d. We are informed that about 3000 tons will be sold at to-morrow's Banca sale. This is an unprecedentedly large amount, the previous record being 2500 tons. In the face of this fact and the extremely heavy visible supply, the outlook is not particularly brilliant for the bull manipulators. Thus far this month the arrivals amount to 3323 tons, and it is estimated that about 5174 tons are afloat.

Copper.—The inflation apparatus suffered a severe setback in London yesterday. Prices there fell nearly £3. Since then there has been practically no change, and the London market closed to-day £63 15s. for both spot and futures. Best Selected was cabled £69 10s. to-day, as compared with £72 of last week. Here there was no market. When the quotation was nominally 15½c., there were no sellers, but after the sudden interruption of the nebular rise there were plenty of sellers at 15½c., but no buyers. Quotations are entirely nominal, and those posted on the New York Metal Exchange are as follows: Lake and Electrolytic, 14.50c. to 15c.; Castings, 14.25c. to 15c.; Standard, 13.75c. The exports so far this month have amounted to 8770 tons, as compared with 16,426 tons for the corresponding period of last year.

Pig Lead.—The market is unchanged here and in St. Louis. The American Smelting & Refining Company quote

4.65c. for 15 days' delivery. They quote spot 4.67½c., but state that they can make no prompt shipment. The shortage of hauling facilities has doubtless affected this market somewhat. The American Smelting & Refining Company are carrying no stock in New York or vicinity, and therefore are dependent upon the carrying companies for prompt delivery. It is said that several thousand tons are awaiting shipment in Chicago. The London market declined 10 shillings during the week to £13 5s.

Spelter.—After advancing here to 5.75c., a slight reaction brought prices to 5.65c., New York, and 5.25c. St. Louis. London advanced to £24 on the 19th, and has declined sharply since to £22 15s.

Antimony.—Is firmer. Cookson's is quoted 8.25c. to 8.50c.; Hallett's, 7c., and other brands, 6.75c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and terms of order. Smaller lots are quoted as high as 60c., according to quantity.

Quicksilver.—Is unchanged at \$47 per flask of 76½ lbs. each in lots of 50 flasks or more. London cables £8 12s. 6d.

Tin Plate.—There is no change, the price made last week still ruling. Business is fair. The price of the American Tin Plate Company is based on \$3.80 per box of 14 x 20 100-lb. Cokes, f.o.b. mill, and \$3.99 New York delivery.

The National Metal Trades Association.

The annual convention of the National Metal Trades Association will be held at the Iroquois Hotel, Buffalo, on April 1 and 2. The following topics will be brought up for discussion:

Compulsory Arbitration: Is it desirable?

Agreements with Unions: Shall this association go into agreements, and on what terms?

Apprentices: Is there any justification for the limitation of apprentices by labor unions?

National Association of Manufacturers: What steps can be taken toward making this association a sort of clearing house of ideas for other associations?

Local Employers' Associations: How valuable are they; how can they be started; how can their influence be extended?

Local Metal Trades Associations: What should be their function; how can their efficiency be increased; how can they be brought into closer touch with the national body?

Boycott: What shall be done to meet it?

Conciliation: In how far is conciliation practicable, and what have other associations really gained by their Conciliation committees?

Free Workmen: How can they be protected; should this association in any way assist the counter organization of free workmen against the tyrannical methods of the labor organizations?

Good of the Order: What can be done to increase the benefits of the membership of the National Metal Trades Association, and increase the efficiency of this association's work?

Hour Question: What should be the policy of this association toward the shorter working day; should the association take any definite action; should the working day in our establishments be shortened or not; if so, how should the change be made; if not, how should the change be resisted?

Injunction Laws: How can they be preserved or improved?

Incorporation of Unions: Is there anything in the idea of union incorporation, and if so, how can same be brought about?

Insurance: Would it be practicable for this association to establish an old age pension for employees, something like the Pennsylvania Railroad, and if so, how?

Immigration: Should immigration be restricted, and to what extent; how can the foreign element be thoroughly Americanized?

Legislation; National, State, Municipal: What are the best means of arousing our members to the vital and pressing necessity of watching legislation; what is the best way for this association to act when confronted with adverse legislation; in how far would be desirable a limited federation with other employers' associations, looking to this end?

Labor Bureau, Local: Of what value are local labor bureaus, and what results have been accomplished by them?

Labor Bureau, National: Would it be advisable for this association to establish a labor bureau for the use of its members in times of peace, as well as in times of strike?

Limitation of Output: Do the unions limit output of our shops; if so, why; and what will be the logical results of such limitation?

Membership: What is the best way to increase the membership of the National Metal Trades Association?

Minimum Rate: Is a minimum rate a premium on inefficiency, making a man depend on the union keeping him in a position rather than his skill and ability; what is the result of a minimum rate, where already established?

Militia: Why do the unions forbid their members joining the militia or remaining in it; how can the anti-militia sentiment be counteracted; would it be advisable to give preference of employment to members of the militia, other things being equal?

National Civic Federation: Is it an honest effort to reconcile capital and labor, or is it a trick to ensnare capital and pull the wool over the eyes of the public?

Newspapers: What is their influence and responsibility for the spread or suppression of lawlessness during a strike?

Officials, Civic and Military: What can be done to secure their faithful efforts to suppress violence?

Premium System: Why does the union oppose premium work; what results are accomplished by the premium system in the shops of members of this association?

Lake Vessel Contracts for 1904.—The American Shipbuilding Company have commenced closing contracts for vessels for 1904 delivery. Last week they closed a contract with the Pere Marquette Railway Company for two more large ships. In many respects the boats will be different from the car ferries now in operation on the lakes. One of them will be intended for car ferrying, but will have twin screws at either end, and will be operated between Port Huron and Sarnia. The other ship will operate across Lake Erie from Conneaut to Port Stanley or Port Dover. She will be a combination car ferry, and will carry cars if desired, but under ordinary conditions cars will be run aboard and coal dumped into the hold of the vessel. The tracks will be so arranged that when the boat reaches port they may be shifted and the cargo unloaded by clam shovels and dumped into cars. There is little return freight on this route, and this plan of ship was decided upon in order to increase the car supply at the American end. One of the boats will be built at Detroit and the other at Buffalo.

The South Pittsburgh Iron Works, recently organized at Claysville, Pa., to manufacture bridges, buildings and other structural works, have taken over the business of the Claysville Foundry & Mfg. Company. They have about completed the grading of their location, have the foundry building, 141 x 65 feet, of steel, well under way, and work is progressing rapidly on the other building, which will be 180 x 80 feet, also of steel. The company are about to open a branch office at the Frick Building, Pittsburgh.

The American Sheet Steel Company have announced the readjustment of sales territory, the old Detroit territory being combined with the Pittsburgh, James A. Smith, Jr., being the district sales agent at Pittsburgh and Walter C. Carroll at Detroit.

The Penn Steel Casting Company of Chester, Pa., have advanced the wages of their molders \$2 per week. The new scale went into effect Saturday last.

A lodge of the Amalgamated Association of Iron and Steel Workers has been organized at Indiana Harbor, Indiana.

The New York Machinery Market.

NEW YORK, March 25, 1903.

There is a report in the street to the effect that the De Laval Steam Turbine Company have been absorbed by the Allis-Chalmers Company. We were unable to verify it, but the report has it that the latter interests acquired the controlling interest in the Turbine Company last Friday, and that a formal announcement will soon be made. In the trade, the opinion is expressed that such a transaction is entirely plausible. The fact is recalled that the De Laval Company recently voted a large increase of stock for the purpose of building a plant to turn out larger units. Comment is also offered on the fact that the Allis-Chalmers Company have a very large new plant, a portion of which could nicely be devoted to the production of steam turbines, large and small. The recent invasion of the General Electric Company into the steam turbine field is also contributory to a general credence of the report in machinery circles. It is said that the Allis-Chalmers Company have been investigating the steam turbine subject for some time and that they manifested considerable interest in the "White" turbine which is designed somewhat along the lines of the De Laval machine. Some of the reports in connection with this matter go so far as to state that the great Western engine builders also intend eventually producing generators and electrical apparatus.

In connection with the great power stations planned for the Metropolitan district, interest is centered largely upon the movements of the New York Central and New York, New Haven & Hartford railroad interests. It is generally known that these interests now have the electrical proposition up before them in real earnest, and that they are looking about for the man who is to be the master of the multitudinous details which will be involved. Engineers who have followed the movements of these roads very closely of late, predict that they are going into the electrification of their lines much more deeply than was at first expected. The hauling of all the trains of this system into the Grand Central Depot electrically will involve the construction of a power station, it is said, larger than that required for the New York Rapid Transit or Subway System. Investigation into the electrical haulage of the trains into New York has caused the companies to inquire into the feasibility of operating all their suburban trains electrically. It is stated that this inquiry has resulted favorably to the electrical scheme. The officials have watched with interest the success of the Manhattan Railway Company in operating the elevated lines in New York City by motor power. This system, which provides each car of a train with motors for its own propulsion, has proved highly satisfactory, and it is thought that the New York Central and New York, New Haven & Hartford systems will work along these lines in equipping their suburban trains. A well informed engineer stated yesterday that the plans even contemplate the running of electric trains to Boston over the New York, New Haven & Hartford Road. This will mean the electrical equipment of this entire system. Such a move is necessarily a long way in the future, and will require a heavy expenditure in the construction of power stations and other equipment. The story is that this is the ultimate object, although it will be reached in stages of gradual development.

In the machine tool trade, a number of good sized propositions came to the front during the week and small trade was very active. The General Electric Company have another large list out, on which we understand preliminary estimates are being made. The equipment it is understood will be used in the new building to be erected at Schenectady, mention of which was made in this column a short time ago. In value, the tools specified will amount to considerably more than \$100,000. The Canadian General Electric Company are now buying a good sized equipment, several nice orders having been placed within the last few days. The amount involved in this transaction we understand is about \$70,000. James T. Cooper & Co. of Lachine Rapids, Canada, who manufacture the Ingersoll-Sergeant line for the Canadian market, have built a very large extension to their plant, and purchased a large amount of machinery. We understand that the orders have not all been placed as yet. The Canada Foundry Company of Toronto Junction will equip a plant for shipbuilding and repair purposes.

The Louisville Bolt & Iron Company of Louisville, Ky., are preparing specifications for a large amount of machinery for the equipment of new mills, in which it is intended to produce sheet steel and corrugated iron.

Purchases were made during the last week for about half of the equipment for the new shops of the Lehigh Valley Railroad at Sayre, Pa. The orders were pretty well scattered along Liberty street.

Additional inquiries have been sent out by the Westinghouse Electric & Mfg. Company. As we stated some weeks ago the equipment for their new shops is being purchased gradually. We are informed that the machines which they are now buying are for delivery next July. Work on the buildings has already been started and the project will be advanced as rapidly as possible. There was a report in the

street to the effect that the Westinghouse Electric & Mfg. Company intended to acquire the plant of the Westinghouse Machine Company, thereby doubling their capacity, and the report further stated that the Westinghouse Machine Company intended erecting a new plant at Trafford City, Pa., where they are now constructing a very large new foundry. This report was officially denied and the work of erecting new buildings parallel with the present buildings of the Westinghouse Electric & Mfg. Company, which is now under way, bears out the original idea of entirely new extensions to the electric plant. We have it on good authority that in the course of five or six years the Machine Company may build a new plant at Trafford City, but that no such move is intended for the present.

The Delaware, Lackawanna & Western Railroad have specifications out for upward of \$50,000 worth of machine tools and good working machinery. We understand that the machines are to be distributed among the Scranton, Kingsland and Dover shops. Both the Seaboard Air Line of Portsmouth, Va., and the Southern Railway, of Washington, D. C., have propositions out for extensive equipments for their various machine shops. The Southern Railway list is said to be a very good one, containing such items as "20 planers." The Pennsylvania Railroad made a number of very good awards during the last few days for their shops at Altoona and other points. One of the best of these orders was awarded to Gould & Eberhardt. It called for 12 large shapers.

The National Enameling & Stamping Company, whose principal offices are located at 81 Fulton street, New York, will soon be in the market for a large equipment of heavy presses and machine tools. They intend erecting a new plant at New Orleans. The principal building will be four stories in height, L shaped, one wing being 60 x 140 feet, and another, 60 x 290 feet. The works will be devoted to the manufacture of stamped and galvanized ware exclusively. One of the extensions will serve as a warehouse and salesroom, in which enameled, japanned and copper wares will be sold in addition to the product of the plant. The buildings will cost about \$200,000, and will be of rather novel construction. There will be no stairs or elevators inside the building. Instead, four towers will be erected just outside of the buildings at various points and connected by fire proof doors with the floors of the building. These towers will contain the stairways and elevators. The buildings will be constructed entirely of brick, steel and concrete, and will be provided with a gravity sprinkler system, which will obtain its supply from large tanks, which are to be placed on the tops of the towers referred to. It is intended to provide the plant with the most modern equipment, and make it one of the most economical and efficient plants of its kind in existence.

The Navy Department have awarded some fair sized machine tool contracts for the League Island, Pensacola and Brooklyn yards. At the last session of Congress, \$81,000,000 was appropriated for the navy, a large amount of which will go into shop equipment, &c.

In the Naval Appropriation bill, March 3, 1903, \$500,000 is made available for the purchase and manufacture of smokeless powder. The smokeless powder factory at Indian Head is to be enlarged and \$55,000 is made available. A new boiler plant will be placed in the navy yard at Washington and \$80,000 is appropriated. The shops at this yard will have new machinery and \$50,000 is appropriated. The gun lathes will be converted from steam to electric drive, and \$25,000 is made available.

Under the Bureau of Yards and Docks \$916,000 is appropriated for the various improvements to be made at the navy yard at Portsmouth, N. H. For certain improvements to be made in the navy yard at Boston the sum of \$290,500 is appropriated.

For the improvements to be made at the New York Navy Yard, \$298,500 is appropriated. Among the items \$30,000 will be expended for an electric plant extension. At the League Island Navy Yard there will be expended the sum of \$309,200 for various improvements. The electrical plant will be extended and \$75,000 will be expended. The fire protection system will be extended and \$35,000 is appropriated. The sum of \$25,000 is provided to complete the machine shops for the Bureau of Steam Engineering. At the Washington Navy Yard \$224,240 will be expended for the various improvements.

At the new naval station at Charleston, S. C., \$300,000 is appropriated. The power house, the machine shop and the joiner shop for the bureau of construction and repair will be completed and the sum of \$225,000 is appropriated. The work on the power house for steam engineering will be commenced and \$25,000 is made available.

At the Norfolk navy yard \$193,000 will be expended. Twenty thousand dollars will be expended for the electric system.

At the naval station at Key West \$165,000 will be expended. This includes a marine railway extension and improvements to the coaling plant.

At the navy yard, Mare Island, \$188,000 will be expended. There will be a new locomotive crane costing \$12,000, a storage tank for oil at the same cost, a railroad sys-

tem will be extended and \$10,000 is appropriated. There will also be an extension of the electric plant system costing \$50,000. A light and power station building will be erected costing \$40,000. The electrical workshop will be extended and \$25,000 will be expended.

At the Puget Sound navy yard \$295,200 will be expended. The electric light plant will be extended as well as the railroad equipment, and \$50,000 is appropriated for continuing the erection of the boat shop. Foundry, copper-smith shop, boiler and blacksmith shop are to be completed at \$50,000 each. The dry dock boiler plant will be extended at a cost of \$10,000. A new locomotive crane and track will be erected around the dry dock at a cost of \$90,000, and \$40,000 is made available at present for the purpose.

At the Pensacola navy yard \$143,000 will be expended.

At the naval station at New Orleans \$111,800 will be expended. Additions to the floating dry dock will cost \$15,000. The steam engineering shops will be extended at a cost of \$50,000.

Thirty-nine thousand dollars will be spent at the naval station, Tutuila. This sum will be expended for grading and filling, waterworks, carpenter and blacksmith shop, buoys and ice-making plant.

At the naval station at Cavite a new distilling plant will be provided at a cost of \$20,000, and the sum of \$300,000 is provided for continuing the construction of the floating steel dry dock.

At the Rhode Island naval station the sum of \$232,000 will be expended.

Under the Bureau of Ordnance \$14,200 is to be expended at the naval magazine on Iona Island. The new compressed air-charging station with pipes and fitting will be constructed, and \$3,200 will be expended for machine tools. The old dock at this island will be improved, and \$9,000 is to be expended. At the naval powder depot at Dover, N. J., \$19,600 is appropriated for four electric elevators for two storehouses and other needed improvements.

Under the Bureau of Construction and Repair, \$20,000 is given for the repairs and improvements of the construction plant at the Portsmouth yard, \$50,000 each for the construction plant at Boston and New York yard, \$35,000 for the plants at League Island, Norfolk and Mare Island, respectively; \$75,000 for the plant at Puget Sound and \$25,000 for the plant at the Naval Station, New Orleans. A steel ammunition lighter will be built for the Naval Station at Cavite, at a cost of \$30,000.

The sum of \$2,090,000 is appropriated for steam machinery under the Bureau of Steam Engineering and \$1,200,000 is provided for the purchase, handling and preservation of all material and stores under this Bureau. The machinery plant at the Boston yard, consisting of electric cranes for foundry, boiler shop and smithery and a quantity of large and powerful machine tools to complete equipment of said shops, will be purchased and \$60,000 is appropriated. Cranes and heavy tools to equip shops as altered at the Norfolk yard will be purchased and \$25,000 is appropriated. A building, as an experiment station and testing laboratory, will be erected at Annapolis for this Bureau at a cost of \$250,000. The necessary equipment of this building will be supplied at a cost of \$150,000.

A recent computation has placed the total aggregate power of steam turbines in use or under construction or ordered in different parts of the world at over 500,000 horsepower. Of this total the major portion is used, or to be used, for the driving of dynamos, alternators or other electrical machinery, while the next in point of power consumption is marine engines. An item in point is the contract recently given to the British Westinghouse Electric & Mfg. Company, Limited, by the Metropolitan District Railway Company of London, England, for four turbo-alternators. Each of these machines is designed for a normal capacity of 5500 kw., but will be capable of carrying an overload of 50 per cent., giving for each unit a maximum output of 8250 kw., or about 11,000 electric horse-power. These turbines will be not only the largest steam turbines ever made, but also the most powerful single cylinder engines of any type whatever in the world. Very few multiple cylinder engines in existence have greater power. Notwithstanding the enormous power they will develop, the dimensions of these engines are only 29 feet in length by 14 feet wide by 12 feet high, the overall length of turbine and alternator being 51 feet 9 inches. The steam pressure will be 165 pounds per square inch, and the speed 1000 revolutions per minute.

Catalogues Wanted.—Reierson Machinery Company, successors to John Poole Company of Portland, Ore., dealers in engines, boilers, pile driving and logging engines, gasoline engines, wood working and saw mill machinery, wind mills, pumps, iron pipe, fittings and belting, would like catalogues, with net prices on the above lines, from manufacturers.

The Standard Steel Car Company of Pittsburgh, with works at Butler, Pa., will erect two new steel buildings, one a warehouse for storing bolts, which will be 125 x 40 feet, and the other a templet shop, 40 x 75 feet.

Cleveland Machinery Market.

CLEVELAND, OHIO, March 23, 1903.

With spring at hand there is not the slightest indication of a falling off in the amount of business coming to manufacturers and dealers in machinery and kindred lines. In fact, it seems as if this month shows more than the usual grist of proposed extensions and improvements. A number of concerns that seemed to feel at the first of the year it would not be necessary to make extensions, are now arranging for them with all haste, while several recently promoted ventures are preparing to erect new factories and will furnish good business for machinery makers. In this city two important industries are developing with remarkable strides—namely, the production of automobiles or automobile material and the manufacture of supplies for the equipping of the immense number of electric railway enterprises which center financially in Cleveland. Both seem almost boundless in their scope, and there is scarcely an iron or machinery manufacturing concern in the district but are becoming identified in some manner with one or both. The demand for machinery in steam railway work has also reached high water mark, and the manner in which all railroads are pushing their motive power to the limit is plainly reflected in the rush orders for tools required in repair shops.

The question of labor is proving a problem that is perplexing more than one big company desirous of running double turn to take care of orders. Good machinists are scarce, and the men evidence their appreciation of the fact by an unwonted show of independence; the majority of them do not care to work nights, and do not have to. There are well defined rumors that May 1 may see another effort to establish that bone of contention, the nine-hour day. There will never be a better opportunity to embarrass the manufacturers, but it is to be hoped that the men who are now enjoying the best conditions in the history of the country will not permit themselves to be induced to "kill the goose that laid the golden egg." The question of fuel supply and cost no longer troubles local manufacturers; in fact, coal has taken an astonishing drop, now that the demand for domestic purposes is falling off. Good run of mine was sold this week at \$2.15, on the track, while less than two months ago manufacturers were begging for the same coal at \$4.50.

An important contract which has been watched with interest by machinery manufacturers was closed last week; that of the Interstate Engineering Company, who are building a large plant at Bedford for the production of cranes and structural material. The equipment will be of heavy character, and the bulk of the business went to Manning, Maxwell & Moore and the Niles-Bement-Pond Company, while the Pattison Machinery Company and Strong, Carlisle & Hammond Company came in for two or three tools each.

The Cleveland Twist Drill Company are moving machinery into their new factory addition, the third erected within two years, which is 50 x 140 feet, three stories and basement. Their business is much heavier than it was last year, and they are experiencing great difficulty in keeping up a stock of their lines of tools. Demand from nearly all the foreign countries shows improvement within the past few months, Germany and the Scandinavian countries being the only exceptions to this rule.

E. H. Dyer & Co., New England Building, have taken a contract with the St. Louis Sugar Company for a complete sugar plant, including warehouse, beet sheds, cooper shop, power plant, &c. They will install an equipment of machine tools. The plant will have a capacity of 600 tons per day.

The Kilby Mfg. Company have placed contracts with the W. H. Pattison Machinery Company for complete machine shop equipments for the six sugar plants they are building. The work of building and equipping these six plants constitutes the largest single season's business in this line they have ever contracted for.

Jos. Dyson & Sons, manufacturers of forgings, have moved into their new addition, and will increase their facilities for large work by installing two Chambersburg steam hammers, one 1500 and the other a 4000-pound hammer. They are installing lathes to rough finish their forgings.

The King Engineering Company, recently organized, have established a shop at 35 Michigan street, where they will manufacture trolley catchers, fenders, trolley wheels and harps, and several other kinds of electric railway supplies, as well as water closet flushers, burglar proof sash locks, and other mechanical devices of their own invention. They expect to install considerable new special machinery.

F. H. Bultman & Co. are doing an immense amount of special gear cutting, their heaviest demand coming from manufacturers of automobiles and cranes. They are also receiving many inquiries for their automatic gear cutters, but are so crowded with jobbing work that they are unable to devote much attention to the production of machines. They are building a large special gear cutter for the Browning Engineering Company. They expect shortly to increase their facilities by taking another floor in their building.

The firm of Brew & Hatcher have been organized by F. O. Brew and W. A. Hatcher, both of whom have been prominently identified with the manufacture of automobiles in this section. They have established offices at 34-36 Co-

lumbus street and factory at 39-41 Winter street, where they will manufacture a large line of parts of gasoline automobiles, including complete motors, transmission gears, carburettors, oiling devices, &c. They will also be prepared to manufacture to order any kind of automobile material. They have purchased a number of high class machine tools, and expect to buy more in the near future. They have already closed some very good contracts and expect to derive a large business from the 15 or more automobile factories in this city and vicinity.

Foot, Burt & Co., manufacturers of multiple drilling machinery, report that at the present time they are receiving more business than at any time in their history. In 20 days this month they closed contracts for more tools than they can build in double that time, and, as a general thing, they are not making contracts for better than 90 days' delivery. They expect soon to increase their facilities by taking another floor in the building they now occupy. Last week they shipped a large multiple drill weighing 18,000 pounds to the Chicago, Milwaukee & St. Paul Railway, and large tools to the St. Louis Transit Company and the St. Louis Car Company, St. Louis, Mo.

The Cleveland Wire Spring Company are occupying their new addition, and are now preparing to market a new device in the shape of a steel truck for handling steel barrels used in foundries and machine shops. The truck engages in two ears on the sides of the barrel, thus saving the work of the additional man usually required to lift a barrel on an ordinary truck. The company are now manufacturing a complete line of steel barrels and boxes for the class of work above mentioned. They report that one of their departments is showing a 50 per cent. increase over last year's business, and there is a good average gain all along the line.

The Cleveland City Forge & Iron Company report that they are very busy on railway forgings, but that unlike the majority of lines, there is little doing in the forgings used for marine work, which in the past has been one of the heavy ends of their business. The small amount of ocean vessel building is accountable for this. An official of the company stated that while the 30 odd vessels being built on the Great Lakes this season appeared very large to the average observer, it amounted to comparatively little, so far as marine forgings are concerned. The large ocean vessels, with twin or triple screw and triple or quadruple expansion engines set in the center of the vessel, furnish a much larger tonnage in steel forgings than lake vessels, which usually have single propeller shafts, with engines set in the stern of the vessel.

The Cleveland Punch & Shear Works state that a very large percentage of their business is coming from railway shops, the general use of steel cars causing a heavy demand for punches and shears. They are furnishing a number of large tools to the Pressed Steel Car Company. Shipments of Cleveland tools this month included a 20-inch double punch and shear for the Hinkle Iron Company, New York; a 12-foot radial drill to the Hammond Iron Works, Warren, Pa.; a large motor driven bending machine to the Standard Steel Car Company, Butler, Pa.; two 19-inch throat punches, one 18-inch throat punch and one 12-inch rotary planer, with 30-inch head, to the Carolina Bridge Company, Burlington, N. C., and one No. 4 multiple punch to the International Harvester Company, Chicago.

The Eastern Ohio Traction Company of this city have completed plans for a new car house and repair shop to be erected at Chagrin Falls to replace the shops destroyed by fire a short time ago. Considerable machinery will be installed to take care of the repair work of the system. The building will be brick and steel, 70 x 150 feet.

Insurance adjusters have not yet settled on the damage caused by the recent fire at the plant of Ajax Mfg. Company. The foundry, which was little injured, was started up to-day, but the machine shop was badly damaged. A large portion of their machine tool equipment was injured, but many of the machines under construction can be cleaned up and completed without much delay. The company have not yet decided about rebuilding on the present site, but they will probably do so.

The Cleveland Dental Mfg. Company are erecting a unique factory for the production of all kinds of dental instruments and supplies. The building will be three stories, 76 x 150 feet, and will embody the latest ideas of slow burning mill construction. It will have large fire proof vaults for storage of patterns and dies, elevators inclosed with brick walls and fire proof doors, boiler house separated from main building by heavy fire proof wall, and the roof concrete and steel construction. The factory will be equipped with fine special machinery designed for their work.

The Cleveland Cap Screw Company are now filling a number of large orders for a new type of cap screw which they have recently perfected. It has a steel shank with a brass head, the two metals being welded by the electric welding process, which the company utilize in the production of a general line of cap screws and bolts. Their products, both all steel and combination metals, are reported to be giving universal satisfaction, and the company are now operating on double turn to take care of orders.

Iron and Industrial Stocks.

The volume of business in industrial stocks during the past week has been somewhat under the average of recent weeks, in sympathy with the reduced business in railroad stocks. The money market continues to dominate the situation, and although the New York banks are now adding to their reserves the surplus available for speculative purposes is still too meager to permit large operations. The greatest activity occurred in Tennessee Coal & Iron, stimulated by the excellent financial showing recently made. The fluctuations in this stock were, nevertheless, somewhat narrow, the high point for the week being 68½ and the low point 65½. Colorado Fuel & Iron on much smaller business showed a fluctuation from 69½, the high point, to 65, the low point. The movement on other stocks was much less, the general market showing steadiness and a good degree of firmness. Transactions have been quite large in the United States Steel Corporation's new 5 per cent. bonds, which sold during the week at 86½ to 88½. At Boston, the price of Dominion Iron & Steel Company's stock was adversely affected by the reports of serious damage by fire to one of their principal coal mines. The stock fell as low as 27½, from which a rapid recovery occurred to 32½.

The International Heater Company of Utica, N. Y., a consolidation of a number of furnace interests in that locality, have by vote of their stockholders reduced their capital stock from \$1,800,000 to \$551,900. The stock originally consisted of 9000 shares of preferred and 9000 shares of common of a par value of \$100 each. The new stock consists of 5519 shares of a par value of \$100 each. The change will be accomplished by retiring and canceling all of the common stock of the company issued or authorized and 3481 shares of the preferred stock authorized but unissued. The number of directors was also reduced from 13 to 7.

Speyer & Co. and Kean, Van Cortlandt & Co. state that the advance applications for the Lackawanna steel bonds largely exceeded the amount of the bonds not subscribed for by the stockholders.

Dividends.—New York Air Brake Company have declared the regular quarterly dividend of 2 per cent.

E. W. Bliss Company have declared a quarterly dividend of 2½ per cent. on the common stock and 2 per cent. on the preferred stock, payable April 1. Books close March 26 and reopen April 1.

It is reported that the Manufacturers' Light & Heat Company of Pittsburgh will increase their dividend in April, paying 3 per cent. quarterly instead of 2 per cent. regular and ½ per cent. extra as heretofore.

The Canonsburg Steel & Iron Works.—PITTSBURGH, Pa., March 25, 1903.—The Canonsburg Steel & Iron Works expect to start up their plant at Canonsburg, Pa., on or about April 1. This is a six-mill plant and the product will consist of steel and iron sheets for stamping, enameling, deep drawing, tinning, galvanizing, japanning, bicycle, showcard and sign sheets and stove and range work. The plant is entirely new and modern, and the officials are John F. Budke, president and general manager; John M. Watson, vice-president and business manager; William H. Paxton, treasurer, and George W. Retberg, secretary.

The Jones & Laughlin and Clairton Negotiations.—PITTSBURGH, Pa., March 25, 1903.—Despite denials to the contrary, we can state that the deals for the absorption of Clairton Steel Company and Jones & Laughlin Steel Company by the United States Steel Corporation are still under way, with a strong probability that both of these concerns will be taken over by the Steel Corporation within a very short time. Prices and terms have been agreed upon and only minor details remain to be arranged.

The Clairton Ore & Coke Company of Pittsburgh, a subsidiary interest of the Clairton Steel Company, have been granted a charter. The new company will build a large number of coke ovens in the Connellsville region to make coke for the three blast furnaces of the Clairton Steel Company.

Reports emanating from Cleveland, Ohio, of a proposed consolidation of the Jones & Laughlin Steel Company, Cambria Steel Company, La Belle Iron Works, Lukens Iron & Steel Company, Otis Steel Company and one or two other concerns have been officially denied. No such proposed consolidation is under way.

HARDWARE.

It will be something of a surprise to many who have been in touch with syndicate buying to learn that the syndicate buyers of New York have revised their lists of clients in accordance with the wishes of the secretary of the National Hardware Association, three out of the four being induced to drop a number of their houses who were objected to as not of sufficient size to justify their having a place among the other houses thus represented. The list of the other firm of purchasing agents was, as we have already announced, so satisfactory as not to require any revision. The secretary of the National Hardware Association is certainly to be congratulated on the accomplishment of a task which was invested with serious difficulties. The success which has crowned his negotiations unquestionably reflects credit on the skill, energy and tact with which they were conducted by him, while at the same time it indicates clearly the disposition on the part of the syndicate buyers to meet the approval of the large jobbers of the country represented in the National Association.

The immediate results of this conclusion of the negotiations are obvious: 1. A number of houses doing more or less of a jobbing business have been removed from the syndicate buyers' lists, and in this way denied the privilege of representation in connection with the larger houses who are employing the system. 2. While there is still a very wide diversity in the size and extent of business of the houses now represented by these New York buyers, they are more nearly equal than heretofore. 3. There has been a practical, though not formal, recognition on the part of the jobbing trade of the country of syndicate buying as a legitimate part of the Hardware business. 4. In view of the tacit approval, more or less official, under which the system is now conducted, syndicate buying is likely to be regarded with more favor and to have in general a more assured place in the trade. In view of these obvious features of the situation, there will naturally be some difference of opinion as to the desirability of the action taken and its influence upon the trade at large.

The situation is evidently invested with some uncertainty and the course of things will be watched with interest. A question will naturally occur as to the course which will be pursued by the houses who have been dropped. After becoming familiar with the benefits of syndicate buying—if we may assume from the number who patronize it that it is found beneficial—they are abruptly debarred from the privilege. It is not to be supposed that they will consent to lose permanently the advantage of a New York representation. Another fact of special significance is the marked increase on the part of the larger retail merchants, some of whom do a limited jobbing business, to unite in syndicates for the purchase of goods. The association movement among Hardware merchants throughout the country is bringing this feature to the front, and the success with which local syndicates are conducted is attracting the attention of the larger merchants to this method of securing advantageous prices. The principle of syndicate buying as a department of the trade being conceded, notwithstanding the evils often connected with it, it is not surprising that enterprising merchants should endeavor to discover some methods by which they can utilize it to their advantage, especially in view of the fierce com-

petition which they are, under present conditions, obliged to carry on with the catalogue houses and department stores. The problem is a difficult and perplexing one.

The conclusion of the report of the meeting of the National Retail Hardware Dealers' Association, which was held last week in Chicago, will be found in the following pages. While not nearly as voluminous as the reports of the various State associations, inasmuch as its deliberations were devoted entirely to practical work rather than to the reading of papers and the discussion of trade questions, the account of its proceedings will be interesting to those who are studying trade tendencies. It is evident that the retail branch of the trade is getting in a position where it should be instrumental in contributing its part to the welfare of the trade at large as well as in securing its own protection and advancing its own interests. With the difficulty and delicacy of some of the questions and the conflict of interests involved, there is obvious need of a reasonable and even conservative disposition in dealing with what are justly deemed trade abuses, and it is gratifying to observe in the expressions and acts of those who are directing the movement evidences of this spirit without any weakness or indecision in standing up for the rights of retail merchants. It promises well for the cause represented by the gathering in Chicago that the officers of the association recently elected, like their predecessors, are merchants of caliber and standing, who may be depended upon to represent faithfully the great trade of which they are the official leaders. The outcome should be a better understanding between the various classes of the trade and the promotion of the prosperity of all.

Condition of Trade.

Perhaps the most noticeable feature of the Hardware market at the present time is the strength which is very generally pervading it. The course of prices for the raw material, whether Iron or other metals, is giving manufactured products a decided firmness, and in a good many lines actual advances have taken place. The confident feeling among the trade is encouraged by these conditions and orders are placed liberally. The chief difficulty is in obtaining goods, and the indications point more decidedly than heretofore to a scarcity in many lines. The jobbing trade are counseling their customers to buy early, and it looks as if this would be the wise course. There is nothing in sight to indicate any general shrinkage in values in the near future, and in view of the tone of the market and the probability that the factories will, even though running to their full capacity, be unable to turn out enough goods to satisfactorily meet the demands of the trade makes it the part of wisdom to secure goods in ample time. There is a general feeling that labor difficulties may interfere with the output of mills and factories, and delays in transportation are likely to continue both to diminish production and defer the receipt of goods. Under these conditions the sale of Hardware is a comparatively easy matter, and there is little need for concessions to induce business. There is more or less cutting, as always, by the jobbing houses, among whom there is keen rivalry, and the existing competition and strife for business is inducing in some sections the making of prices which are unnecessarily low. In a number of lines in which advances have taken place the jobbers' prices are below those of the manufacturers.

Chicago.*(By Telegraph.)*

A more ample supply of Coke is available to manufacturers of Hardware Staples and Specialties, and some little improvement is reported from time to time in the cars obtainable for the distribution of the manufactured product. But this is not general, and transportation service is still of an intermittent character; and while some little improvement is noted in the assembling of raw material, there are still a number of annoyances, so that manufacturers are cautioning agents about making promises of goods for early delivery. Manufacturers of Wire and Fencing, while noting some impression upon accumulated orders, are still very much behind in making shipments. This is also true of Steel Goods, jobbers reporting more and more difficulty in obtaining supplies to apply on contract, while consumers are urgently demanding shipments of goods not only on contracts the time for which has already passed, but many are urgently requesting anticipation of shipments, which under the circumstances is almost impossible. The delay in shipments of Hoes, Rakes, Shovels, Spades and similar articles is reported by manufacturers to be due largely to the inability of obtaining Handles. The subsidence of the floods in the Southwest, it is anticipated, will be followed by an urgent demand for Fencing and other supplies, made necessary by the washouts, and jobbers are fortifying themselves to meet the increased demand for such staples. The warm weather which prevailed the early part of the week acted as a powerful stimulant to trade, especially for spring goods, the warm weather being followed by a flood of orders by mail and wire and urgent requests for shipments on orders previously placed. In fact, some local jobbers report that they have made heavier shipments within the last week or ten days than ever before in the history of their trade. The demand for Wire Cloth and Screen Doors is reported to be even greater than it was this time a year ago, but supplies of this sort are much more ample than they were last March, when, it may be remembered, there was very much difficulty in obtaining even ordinary amounts. Poultry Netting has continued especially active. The orders for Hatchets, Saws, Drawing Knives, Augers, Chisels and other Carpenters' Tools have been unusually heavy even for this season, and the demand for Builders' Hardware has been increasing materially, an urgent call being made for shipment of small orders from stock as well as on contracts, while several contracts for large buildings have consummated during the week, one order having been received from New Orleans for the fitting of a 16-story building. The movement in Refrigerators, Ice Cream Freezers, Lawn Mowers and other seasonable goods of this character has been greatly stimulated. The returning winter weather during the past few days, however, will modify the urgency of the calls from dealers. In Heavy Hardware there has been a further increase in the demand for Bars, Bolts, Nuts, Rivets, Screws, including Blacksmiths' Supplies and Wagon Material, especially for Tires, Rims, Hubs, Spokes, &c. Machine Bolts have been advanced 10 per cent., and manufacturers of Hot Pressed Nuts, both square and hexagon, have revised prices, the discounts now being \$5.20 for square and \$5.40 for hexagon from list, Tapped being 20 cents above these prices. Lead and Ingot Copper, while strong, have not further advanced during the week, but Sheet Zinc is now ½ cent higher and Spelter records another advance of 10 cents. Black and Galvanized Plates are again stronger and several independent mills have either withdrawn or advanced prices. The strike which affected the plumbing supply houses last week has now been submitted to arbitration, and the outlook is favorable to an early settlement. The demand for Merchant Pipe from jobbers has been rather stimulated than otherwise.

St. Louis.*(By Telegraph.)*

The very favorable conditions of trade continue in the Hardware market, and the volume of demand is such as to keep the jobbing establishments very lively centers of activity. Local conditions, owing to labor dif-

ficulties and the consequent interruption of building operations, have made some difference in the demand for Builders' Hardware, but this, it is hoped, will be but transient and matters will soon be adjusted. Shipments in large volume of Shelf Goods, Steel Goods, Refrigerators, Ice Cream Freezers, Washing Machines, Lawn Mowers, Wire Cloth, Poultry Netting, Screens, Screen Doors and many other lines keep the shipping departments on the move. Shortage of Saws, Mallets, Agricultural Handles and several other lines is still an issue of complaint on the part of the jobbers. The general conditions of present demand and future prospects for business in all territory covered from this point are said to be most promising. Carriage and Wagon Hardware are meeting with a very fair demand, in line with other classes of material handled in the heavy department of this market.

NOTES ON PRICES.

Wire Nails.—Demand continues active and mills are well filled with orders. Conditions have been unchanged for some weeks—specifications coming in freely and a considerable number of new orders being placed. Many who had already purchased find that they have not enough Nails to carry them through their spring trade. The market is remarkably steady and prices are decidedly firm. Quotations are as follows:

Jobbers, carload lots.....	\$2.00
Retailers, carload lots.....	2.05
Retailers, less than carload lots.....	2.15

New York.—Local business has been temporarily interfered with during recent stormy weather. On an average demand for small lots of Nails from store is good and entirely satisfactory. Quotations are more closely adhered to than for some time, and are as follows: Single carloads, \$2.20; small lots from store, \$2.25 to \$2.30.

Chicago, by Telegraph.—Most of the important Nail mills, both independent and combination, are reported to be running quite full with an ample supply of fuel, and some little improvement is also noted in the car situation, allowing freer shipment; but producers are still far behind in the filling of orders. Specifications continue to come in quite freely and new business is fully as heavy as the manufacturers care to see. The jobbing trade is increasing and the market is firm in tone with full prices realized, sales being on the basis of \$2.20, manufacturers selling to jobbers 5 cents less f.o.b. cars, Chicago.

St. Louis, by Telegraph.—Prices are firm and a very steady demand continues for Wire Nails. Jobbers quote in small lots from store \$2.30.

Pittsburgh.—The Wire Nail market is exceedingly strong in every way, demand being heavy and prices firm. We understand that one large mill is quoting \$2.05 minimum. It is the general belief of the trade that prices of Wire Nails will be higher owing to heavy demand and the scarcity and high prices of Steel and Coal. Deliveries are still unsatisfactory, but are better than some time ago, as the railroad situation seems to be gradually clearing. Prices are being firmly maintained and we quote: Wire Nails \$2 in carloads to jobbers, \$2.05 in carloads to retailers and \$2.15 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days; for Galvanizing Nails 75 cents per keg is charged and for Tinning Nails \$1.50 per keg extra.

Cut Nails.—Demand continues good, buying having been more active in anticipation of an advance in prices. It is understood that during the past week some manufacturers have refused to accept contract orders until after the meeting of the Cut Nail Association, which is to be held this week. The feeling has been expressed by these same manufacturers that they should get more money for their Nails owing to the high price of Steel and the difficulty in getting it. Manufacturers of this class may or may not be a minority at the meeting. Quotations are as follows: \$2.10, base, in carloads, and \$2.15 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off 10 days.

New York.—There is a steady demand for Cut Nails in the local market, which continues firm. Quotations for carloads and less than carloads are as follows:

Carloads on dock.....	\$2.24
Less than carloads on dock.....	2.28
Small lots from store.....	2.35

Chicago, by Telegraph.—There has continued to be a good demand, with some little increase in movement through more ample transportation facilities. The market continues firm, with an advance anticipated for prompt shipments. The jobbing trade has increased materially. The local order trade continues to be met on the basis of \$2.26½ in carload lots and \$2.36½ for less than carload lots for Steel, Chicago. Iron Nails are held at \$2.50 per keg from store, Chicago.

St. Louis, by Telegraph.—Cut Nails continue in fair demand, and jobbers' quotations are as follows: Steel at \$2.42 and Iron at \$2.55.

Pittsburgh.—There is a good demand for Cut Nails, and the tone of the market is very firm. In some quarters the belief is expressed that there will be no change in price of Cut Nails for April delivery at the meeting of the Cut Nail Manufacturers' Association, to be held this week. Deliveries of Cut Nails are improving, as the railroad situation is better. Prices are firm and we quote: Steel Cut Nails, \$2.10, base, in carloads and \$2.15 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination, 60 days, less 2 per cent. off in 10 days. Iron Cut Nails take 10 cents advance over Steel.

Barb Wire.—The mills have orders on hand which will keep them well employed for some months. There is considerable new business, and specifications on contracts are coming in freely. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.30	\$2.60
Retailers, carload lots.....	2.35	2.65
Retailers, less than carload lots.....	2.45	2.75

Chicago, by Telegraph.—Specifications on contracts placed some time since continue to be received in liberal amount and new orders for early and later shipments are increasing rather than otherwise, but the mills are gradually getting into better position to take care of heavy tonnage already placed and in sight. Galvanized sells at \$2.80 in carload lots and \$2.90 in less than carload lots, Chicago. Staples have been selling well at \$2.35 in carload lots and \$2.45 in less than carload lots.

St. Louis, by Telegraph.—Sales of Barb Wire continue on a good scale. In small lots from store Painted is quoted at \$2.65 and Galvanized at \$2.95.

Pittsburgh.—A moderate amount of new business is being placed in Barb Wire, but is confined mostly to small lots, the larger trade having evidently covered their requirements before the recent advance in prices was made. The tone of the market is firm. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, \$2.30; Galvanized, \$2.60 in carloads to jobbers; Painted, \$2.35; Galvanized, \$2.65 in carloads to retailers; Painted, \$2.45; Galvanized, \$2.75 in small lots to retailers.

Plain Wire.—From present indications the season's business is likely to be heavy in this line. New orders and contracts have amounted to a large tonnage at the mills. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.90
Retailers, carloads.....	1.95
Less than carloads.....	2.05

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	10	11	12	12½	13	14	15	16	17	18	
Base	\$0.05	.10	.15	.25	.35	.45	.55	.70	.85	Plain.	
	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	1.70	1.85	Galv.

Chicago, by Telegraph.—Liberal orders for both Plain Wire and Wire Fencing have been received during the past week, and with liberal specifying on old contracts the mills are being pushed to their utmost capacity.

The jobbing trade has increased materially and the market is strong. Sales are being made for Nos. 6 to 9 on the basis of \$2.05 to \$2.10 in carload lots on track and \$2.15 to \$2.20 in less than car lots from store, Galvanized bringing 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

St. Louis, by Telegraph.—The market conditions continue strong, and a very good line of sales is reported by the jobbing trade. No. 9 is quoted at \$2.25 and Galvanized at \$2.55 in small lots from store.

Pittsburgh.—A moderate amount of new tonnage in Plain Wire is being placed, but most of the large buyers covered before the recent advance in prices was made. Shipments are improving, and there is less complaint in regard to deliveries than for some time. The tone of the market is firm and we quote: Plain Wire, \$1.90, base, for Nos. 6 to 9 in carloads to jobbers, \$1.95 in carloads to retailers and \$2.05 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

Carriage Bolts.—During the past year or so the market has been more or less disturbed by the entrance of Bolts which depart from the regular standards and are manufactured by a less expensive process, being described as of scant size, with rolled thread, and cold headed. They have been put on the market at prices under those established by the makers of the regular goods, who for a time ignored them, relying upon the superior quality of their own product. Competition of this class of Bolts, however, has become so important a factor in the trade that at the last meeting of the Associated Manufacturers it was deemed advisable to make a reduction in price on the sizes of Bolts affected thereby. Action was accordingly taken by which Carriage Bolts ¾ x 6 inches and smaller are sold at a price about 10 per cent. less than the other sizes, the price on which remains unchanged. With this exception the Carriage Bolt market is referred to as in very fair condition, prices being, on the whole, pretty well maintained, and with less irregularity than a short time ago. The volume of business is large and the outlook for a heavy trade is excellent.

Copper Goods.—The increased cost of Copper continues to have a marked influence on products into which this metal enters as an important material. Advances have been made in a number of lines, and other goods in which no advance has yet taken place are held with increasing firmness. This is the case with Copper Rivets and Burrs, for which the manufacturers are taking orders only for immediate delivery.

Washers.—The market for Wrought Iron Washers has a strong tone, and prices are firmly maintained.

Galvanized Pump Chain.—The cost of the raw material is contributing to the strength of Galvanized Pump Chain, and slightly higher prices are announced by leading manufacturers.

Tin, Galvanized and Japanned Ware.—The manufacturers of Kitchen Utensils and House Furnishing Goods, such as Plain, Retinned and Stamped Ware, Polished, Galvanized, Pieced and Japanned Wares, Tinner's Trimmings, &c., acting in concert at a meeting held in Cincinnati, Ohio, March 16, have, under various dates since that conference, issued subsidiary lists covering, perhaps, a quarter of the items in the main list, making advances of somewhere from 5 to 12½ or 15 per cent., as near as can be approximated, with an average advance of about 7½ per cent., subject to the same discounts of 10 and 7½ per cent. to parties on the classified list. These changes are effective from March 16. The greatest changes appear to be in Retinned Goods.

Roofing and Building Papers.—The manufacturers of Tarred Felts, who for some time have had control of the market in this line, have advanced the price of Single Ply Tarred Roofing Felt within a few days from \$1 to \$2 a ton in the various territories, in which prices are graded according to the distance from manufacturing points. Single Ply Tarred Felt is now quoted in New York and adjacent territory at \$35.50 per ton in less than carloads and \$32.50 for car lots. There are no changes as yet in Two and Three Ply Felts, which are quoted at

55 to 60 cents for Two-Ply and 78 to 85 cents for Three-Ply, the lower prices being for carloads. Rosin Sized Sheathing in this territory is \$34 per ton, less than carloads, and \$31 for carloads. Deadening Felt is now as high as it is likely to go this season, at \$42 to \$45 per ton, any change being likely to be a concession from these prices.

Cordage.—The demand for Rope continues steady and in fair volume. Quotations are unchanged, as follows: Manila Rope, on the basis of 7-16-inch and larger, from 11¼ to 11½ cents, according to maker. Sisal Rope is made to a price, and quotations on the above basis range from 8 to 10 cents per pound, according to quality. Both kinds of Rope are subject to a rebate of ¼ cent per pound in large quantities.

Paris Green.—There is very little activity in the market, owing to the fact that it is between seasons and buyers have not begun sending in duplicate orders. Quotations remain unchanged, as follows:

Less than 1 ton.	Per lb.
Arsenic kegs or casks.....	13½c.
Kegs, 100 to 175 pounds.....	14c.
Kits, 14, 28, 56 pounds.....	15c.
Paper boxes, 2 to 5 pounds.....	15c.
Paper boxes, 1 pound.....	15½c.
Paper boxes, ½ pound.....	16c.
Paper boxes, ¼ pound.....	17c.
One to 5 tons, 1 cent per pound less; 5 tons and over, 1½ cents per pound less.	

Glass.—The conference between the Independent and Federation Glass companies and the outside companies which was held last week gives some promise of an agreement being reached to close all factories on April 18. It is reported that about 500 pots outside the Independent and Federation companies have agreed to close down, provided 200 additional pots, or a total of 700 pots, go out of blast. Committees were appointed to confer with factories not represented at the meeting to endeavor to get them to close their plants on that date. The American Window Glass Company have severed their connection with all associations and are not taking any part in these negotiations, as they have closed all except their machine equipped plant. It has been estimated that there is a total of about 3,800,000 boxes of Glass in the hands of manufacturers and jobbers, or enough to provide for a normal demand for about nine months. Should all plants agree to close in April, it would appear that a price war may be averted. It is reported that if the factories are not closed at that time the American Company will put their holdings of something over 1,000,000 boxes of Glass on the market at a price which would move it. It is also said that they will sell direct to the retail trade, in this event, but this is without official confirmation. Quotations of the Jobbers' association, for either single or double strength, are as follows:

	Discount.
From store.....	.90 and 10 %
F.o.b. factory, carload lots.....	.90 and 20 and 2½ %
F.o.b. factory, 2000-box lots.....	.90 and 25 %

Oils.—*Linseed Oil.*—There is a good steady demand for Linseed Oil, mostly in small lots. The stiffening of the Seed market has advanced prices on out of town brands. Quotations, according to quantity, are as follows: City Raw, 46 to 47 cents; out of town Raw, 43 cents per gallon.

Spirits Turpentine.—The demand for Turpentine is more active, and prices at this point have advanced. Quotations, according to quantity, are as follows: South-erns, 68½ to 69 cents; machine made barrels, 69 to 69½ cents per gallon. The new crop, which has been somewhat backward, is now reported from the South as beginning to come in, in larger quantities.

THE FARM IMPLEMENT NEWS COMPANY, Masonic Temple, Chicago, Ill., have issued Volume XIII of their "Buyers' Guide" to the purchase of Farm Implements, Machines, Vehicles and Repairs, which is revised and issued annually. This cloth bound book of 278 pages is carefully compiled and is useful for reference in the field to which it relates. One feature is the giving of names and brands to the various articles whenever practicable,

which aids in finding the manufacturers of goods known by a specific name.

Correspondence.

The New York Association.

BROOKLYN, N. Y., March 21, 1903.

To the Editor: I have just finished reading your excellent account of the New York State Hardware Dealers' Association's annual convention and have vainly perused the list of members for one small atom of hope, one name of a dealer from New York City, but find it not. Here in the great metropolis there does not seem to be a man to stand out for association or organization.

We have all the evils mentioned by the speakers at that convention and many others. The question of manufacturers selling direct is perhaps so prevalent here that we are calloused. Other abuses are the shattering of prices on standard lines of Tools by department stores for the sole purpose of making capital for themselves; jobbers visiting small carpenter shops, mills and factories and quoting prices on goods that would make it ruinous for a retail dealer to try and compete with them, taking of the trade of furnishing new buildings with Hardware by manufacturers direct almost entirely out of the retail dealers' hands.

Are we city dealers going to see all country dealers organize and do nothing ourselves?

Would a little missionary work by the National Association be amiss in New York and Brooklyn? R. J. A.

ANNUAL MEETING OF THE HARDWARE CLUB.

AT the annual meeting of the members of the Hardware Club, held Saturday, March 21, the following gentlemen were elected to serve as governors for the term of three years, expiring in 1906—viz.: Eugene Bissell, Thomas F. Keating, J. Leonard Varick, Richard R. Williams and William Bishop. The full board in the near future will elect officers to serve during the ensuing year. A perusal of the treasurer's report shows the club to be in an exceedingly sound and prosperous condition. The resident membership is not only full to the legal limit of 600, but there is a waiting list of 36 ready to fill vacancies as they occur. At a recent meeting of the Board of Governors seven resident members were elected together with four nonresident members, four members having resigned March 16. The address of the president, Edward C. Van Glahn, here reproduced, speaks well for the present and past management of the club's affairs:

President Van Glahn's Address.

If I should say that the past year has been the most successful in the history of the club it would be but a reiteration of a statement which has been made at all our former annual meetings. That statement has been perfectly true heretofore, but never more so than to-day, for during the 11 years that this club has been in existence it has enjoyed a steady, uninterrupted and increasingly prosperous career, until to-day it stands, all things considered, without a peer in the club world.

This ambitious declaration, boastful as it may sound, is vouched for by many men of many minds at home and abroad, who have from time to time enjoyed the club's hospitality and have spread its fair fame and sung its praises well nigh around the globe.

The past year has been not only prosperous but harmonious, and when we consider the large membership of the club, made up of men representing so many different professions and business interests, that also is gratifying.

It has been the aim of the Board of Governors to make and keep the club rooms attractive and comfortable. It has also been their aim to keep the *cuisine* of the club up to its original high standard.

The report of the House Committee shows that the charges are conservative and as reasonable as is consistent with good business management. The gain made during the past year is so small as to forbid even the

slightest reduction in charges, and yet sufficient to assure the club a stable, solid financial foundation.

The club has added during the past year to its net surplus the sum of about \$2000, so that while the present membership is daily and yearly enjoying the benefits of its own contributions to the club (rather than setting aside large sums for posterity to enjoy), it is nevertheless surely but slowly putting the club in possession of a handsome capital as the years roll by. This surplus has now reached the sum of \$20,000 in cash, exclusive of the plant, one of the most complete in the possession of any club, exclusive also of the pictures, furnishings, &c., to which additions are constantly being made in excess of the usual wear and tear.

I want to make mention of a fact which should be especially gratifying. On the 28th day of February there was owing this club for arrears of dues and house charges less than \$200. This, I think, is a fine reflection of the character of the individual membership of the club and is a statement which cannot be made by any other club approaching the size of ours. It may also be a glowing tribute to the activity and devotion to duty of our worthy treasurer.

I want to make public mention of the faithful, painstaking and capable services of our superintendent, Mr. Blanc, and that loyal corps of servants under him. There has been a substantial addition of paintings now owned by the club to take the places of those formerly loaned, which are a credit to the Art Committee.

And that waiting list, a pride to all our members, bearing testimony to the commendable efforts of a vigilant Committee on Admission. Applications for membership are coming in almost daily, and it is a source of sadness often to remember that only by the loss of some familiar figure can these applications be acted upon.

As the club grows older in years death seems less kind, and the past year has witnessed the departure of some of our most cherished and prominent members. How easily you will recall them:

Peter McCartee, vice-president of the Stanley Works and an honored president of this club.

E. H. Perkins, Jr., president of the Importers and Traders' National Bank and a leading financier of this city.

John W. Mackay, president of the Postal Telegraph & Cable Company, our popular landlord and a loyal member of the club.

Maurice J. Power, Aqueduct Commissioner and former judge.

Geo. H. Burford, president of the United States Life Insurance Company.

William H. Williams, director of the Union News Company.

George H. Chatillon, head of the large scale manufacturing house bearing his name.

Albert C. White, president of the Providence Telephone Company.

Thomas Leeming, American agent for Nestlé's Food—a familiar figure in the club and an enthusiastic member.

David H. Darling, president of the United States Battery Company.

Col. Wm. L. Heermance, with a brilliant Civil War record and sadly missed by a host of friends.

John W. Mason, wool merchant and Christian gentleman, admired and respected by all who knew him.

Winfield D. Walkley, vice-president of the H. D. Smith & Co., who finished his earthly career at the age of 41 and died like a hero.

W. H. JACOBUS, 90 Chambers street, New York, who represents directly in the territory of Greater New York a number of concerns manufacturing lines of both Staple and Special Hardware, will about May 1 move to 155 Chambers street, between West Broadway and Greenwich street, where he has leased a better store of about the same dimensions. The other Hardware representatives sharing the same floor with him where he now is will also take new quarters at 155 Chambers street.

COMMERCIAL TRAVELERS' MUTUAL ACCIDENT ASSOCIATION.

THE COMMERCIAL TRAVELERS' MUTUAL ACCIDENT ASSOCIATION OF AMERICA held their twentieth annual meeting at Utica, N. Y., on March 9. The meeting was largely attended and the proceedings were of a very lively character, owing to the fact that a new secretary-treasurer was to be chosen, Edward Trevett, who has filled the office for 19 years, withdrawing on account of ill health. The new secretary-treasurer is Geo. S. Dana, who received 443 out of 735 votes cast. Mr. Dana has been a member of the well-known firm of Wright, Dana & Co. of Utica for many years, being very active in the management of the business until about two years ago. He has been a member of the Board of Directors of the Travelers' Association for 18 years, and is therefore in exceptionally good position to take up the work of his new office. Henry D. Pixley was re-elected president. John R. Lewis was elected director to succeed Mr. Dana. R. H. Wicks, E. F. Crumb and T. M. Glatt were re-elected directors. All the officers' reports indicated steady growth in the association. The membership at present is 30,665. The total income for the past year was \$223,580. The total assets at the present time are \$223,123. During the past year claims have been paid to the amount of \$164,928.

CLARK BROS. BOLT COMPANY.

ONE of the oldest Bolt concerns in the country have lately been incorporated under the laws of Connecticut, and will be known hereafter as the Clark Bros. Bolt Company of Milldale, Conn., as succeeding the co-partnership of Clark Bros. & Co., manufacturers of Bolts, Nuts, &c. The officers elected are: Henry H. Clark, president; Chas. H. Clark, vice-president; W. H. Cummings, treasurer; Edwin S. Todd, secretary; Chas. C. Persiani, superintendent; Chas. W. Clark, sales agent. This business was started in Milldale, Conn., in 1851, by Wm. J. Clark, who in 1854 associated with him his two younger brothers, Henry H. and Chas. H. Clark. In 1871, Wm. J. Clark sold out his interest to Clark Bros. & Co., and at the same time Wm. H. Cummings and Robert W. Bemiss were admitted as partners to the firm. Mr. Bemiss died April 16, 1893, and the business has since been continued by the remaining partners. Both Henry H. and Chas. H. Clark, the senior members of the new company, have been very closely identified with the growth and development of the business for the past 50 years, and are still active and alert in taking up improvements affecting the successful and profitable manufacture of goods in this line. Besides the Bolt business they have been connected with other important enterprises in the town, and are respected and esteemed citizens of the community.

The bulk of the product of Clark Bros. Bolt Company goes to consumers in the Agricultural Implement manufacturers' line, and many original and special patterns of bolts have been introduced by them to this class of trade, meeting the requirements of construction of special Farm Tools as improved upon from time to time. For many years "Clark's Concave" Carriage Bolt has been a familiar article of commerce, dating back to about 1865, and is used to-day quite extensively. This Bolt was first made under Wm. J. Clark's patent. Their line at present includes Carriage, Machine and Plow Bolts, Rivets, Washers, Cold Punched and Hot Forged Nuts and many special Bolts and Screws. They confine themselves wholly to the manufacture of Bolts and kindred articles, except as an accessory to their shipping they operate a cooper shop and furnish cooperage goods to neighboring concerns. The company maintain a Western office at Chicago, Ill., under the charge of C. W. Clark.

THE annual meeting of the Fruit-Oil Hardware Company of Sharon, Pa., was held a few days ago; John Carley was elected president of the company and J. J. Spearman, the veteran iron manufacturer, was elected a director. A 6 per cent. dividend was declared.

NEW YORK HEADQUARTERS OF NATIONAL CYCLE TRADE ASSOCIATION.

THE NATIONAL CYCLE TRADE ASSOCIATION has opened a New York office in the new Irving Building, corner of Chambers street and West Broadway, in charge of A. M. Scheffey, assistant treasurer. It is the wish of the officers to make this office a headquarters so far as its active and associate membership is concerned, as well as a source of information to such as are interested in the association and its business. To accomplish this result a register will be provided in which the members and their friends are urged to register their names at once on arrival in New York, together with address while here. It is the purpose to so manage the office that it will be used as a headquarters where correspondence can be conducted, mail delivered and information obtained as to visiting members. The office will be at the service of the Cycle trade visiting the city and which is urged to avail itself of its advantages.

DISAPPEARANCE OF CHARLES G. DENNISON.

THE trade will learn with regret of the mysterious disappearance of Charles G. Dennison, the head of the house of C. Sidney Shepard & Co., Chicago, which is a branch of the parent house of Sidney Shepard & Co., Buffalo, N. Y. Mr. Dennison, who is 61 years old, left Chicago Monday, March 16, to attend a meeting of the directors of the firm in Buffalo. Within a few hours after his arrival James G. Forsyth, one of the firm, who had been sick for a year, and was a life long friend of Mr. Dennison, died at his home of paralysis. On Wednesday morning Mr. Dennison was last seen, and since then all trace of him has been lost. He had always been exceedingly attentive to business details, but some years ago his health began to fail and he was deeply affected by the total destruction by fire of the Chicago house, of which he was the head, about a year ago. Mr. Dennison, at various periods, established branches of the house in St. Louis, Kansas City, Denver, San Francisco and Seattle. It is thought that the death of Mr. Forsyth, to whom he was much attached, coupled with his condition for several years back, has dethroned his reason.

TRADE ITEMS.

J. F. MCCOY COMPANY, 26 Warren street, New York, importers of and dealers in Railway Supplies and General Hardware, will, during April next, move from their present location to 157 Chambers street, between West Broadway and Greenwich street. They have leased the street floor and basement and in the near future will have possession of the first and second lofts, hiring other floors outside for storing stock until they can get the additional room at No. 157 necessary for their purposes.

WILLIAM E. KLEINE & Co., formerly at 89 Reade street, New York, dealing in Carriage and Wagon Materials, including Wheels, Shafts, Spokes, Rims, Axles, Springs, Steel, Iron, &c., together with Machinery, Tools and General Supplies, have moved to 120 and 122 West Broadway, between Reade and Duane streets, where they carry stocks of this class of merchandise for the trade.

R. HEINISCH'S SONS COMPANY, Newark, N. J., and 90 Chambers street, New York, manufacturers of Shears and Scissors, will, on May 1, move their New York branch, under the management of Frank Harrison, to 155 Chambers street, between West Broadway and Greenwich street, where they will still carry a stock of Cutlery for nearby trade.

WILLIS H. SIMPSON, 90 Chambers street, New York, will, on or before May 1, remove to 155 Chambers street. Mr. Simpson represents directly several well-known manufacturing concerns, carrying full lines of samples, including the David Maydole Hammer Company, Norwich, N. Y.; William Schollhorn Company, New Haven, Conn.; J. M. Carpenter Tap & Die Company, Pawtucket, R. I.; Atlas Mfg. Company, and West Haven Mfg. Com-

pany, New Haven Conn., the latter making Universal Power Hack Saws and Blades, and H. K. Porter, Everett, Mass., Bolt Clippers.

THE KILBOURNE MFG. COMPANY, Troy, N. Y., have recently reorganized under New York State laws with a capital stock of \$50,000, and have given up their Vermont charter. They will manufacture Hardware Specialties and Wire Goods as heretofore, but with increased facilities. The company have also taken over the business of the Vermont Turning & Lumber Company, Bennington, Vt., manufacturers of Fire Screens, Easels and Wooden Novelties. They have also acquired the business of W. H. Shields & Co., which was formerly the Estate of W. F. Greene, manufacturers of Stove Trimmings and Nickeled Goods.

C. E. PEABODY & Co., 90 Chambers street, New York, who represent in this territory directly 11 different manufacturing concerns producing General Hardware and House Furnishing Goods, will remove about May 1 to 155 Chambers street. They represent the Central Hardware Company, Philadelphia; Parks & Parks, and the Troy Oil Works, Troy, N. Y.; Taplin Mfg. Company and the Malleable Iron Works, New Britain, Conn.; J. M. Mast Mfg. Company, and George H. Calder, Lancaster, Pa.; Kilbourne Mfg. Company, Troy, N. Y.; White Mop Wringer Company, Jamaica, Vt.; Caldwell Mfg. Company, Rochester, N. Y., and C. H. Calor, Plainville, Conn.

P. & F. CORBIN, Chicago, report having secured through A. Baldwin & Co., Limited, New Orleans, La., the contract for furnishing the Hardware for the 16-story Hibernian Bank Building. All the inside ware is of special design with monogram knobs. The contract price is about \$8500.

E. K. TRYON, JR., & Co., Philadelphia, Pa., well-known merchants in Sporting Goods, who have for a number of years been located at 10 and 12 North Sixth street, in that city, have opened a large addition to their present store. Property at 611 Market street has been acquired, which connects directly with the former store, this purchase giving them 10,000 square feet additional floor space and enabling them to double their former facilities. The new store not only gives additional room for the display of seasonable Athletic Goods, but a unique sample department has been established for the benefit of out of town buyers. Over 1000 articles have been mounted on boards and arranged for handy inspection. This feature alone paves the way for a larger wholesale business, as does the reorganizing and enlarging of the shipping and mail order departments. There has also been set aside a special room for the display and trying on of all kinds of Sporting Shoes. A complete assortment of Cutlery, Pocket, Table and Gross Goods, Canoes, Row Boats and Naphtha Launches are to be added to their stock.

FRED H. COZZENS, 253 Broadway, New York, and formerly president of the United States Company, 13-21 Park Row, is now the factory representative and a jobber of staple Hardware lines at the above address. He is desirous of securing the accounts of some good factories in such lines as Picks and Mattocks, Spikes, Anvils, Iron and Steel and kindred lines suitable for the export and railroad supply trade.

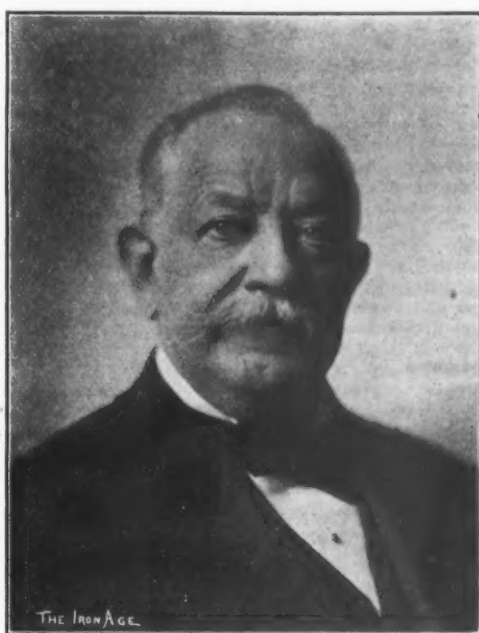
R. R. MABIE ROOFING COMPANY, 154 Chambers street, New York, have just issued a compact booklet on modern Roofing, illustrated in color, showing in sectional views the methods used by them in applying Standard Flat Tile Roofing and Asphalt Slag Roofing. In connection with each class of roofing are printed specifications showing in detail the best way of laying the roofs, which are intended for the roofer using this class of materials. On one page is a list of important buildings in this vicinity where they have laid the Tile Roofing, another page giving nearby addresses where both kinds of roofing have been laid.

Mont. Frantz has purchased the interest of Frank Frantz in the Frantz Hardware Company, wholesale and retail, Enid, O. T., and will continue the business as sole proprietor under the same style. Frank Frantz has retired.

DEATH OF JAMES G. FORSYTH.

JAMES G. FORSYTH of the firm of Sidney Shepard & Co., Buffalo, N. Y., died at his home in Buffalo on the morning of March 18, after a short illness. Mr. Forsyth's health had been failing for over a year, his ailment developing into paralysis, which finally resulted in unconsciousness some hours before his decease.

Mr. Forsyth was born in Buffalo, April 17, 1832. While very young he went to live in Kenosha, Wis., receiving only the rudiments of a common school education and apprenticing himself at an early age to the Hardware firm of Marshall & Phelps, where he learned the trade of tinsmith. After serving the most of his apprenticeship in the true old fashioned style he was released by the dissolution of the firm. He then went to Geneva, Wis., where he worked for a few months at his trade, returning to Buffalo in 1852, where after a determined effort he ultimately succeeded in securing a position with Pratt & Co., then a leading wholesale Hardware house. He remained with them until 1856, when



JAMES G. FORSYTH.

he accepted a position with Sidney Shepard & Co., obtaining a partnership interest in that concern about four years later. His unfaltering energy and ability here made itself felt in building up the business and reputation of Sidney Shepard & Co., important branches of which at different intervals have been established in Chicago, St. Louis, Kansas City, Denver, San Francisco and Seattle.

Mr. Forsyth was always heart and soul in his work, yet never too much absorbed to meet traveling men and others with a kindly word and smile, making many friends who will sincerely mourn his death. He was a childless widower, Mrs. Forsyth having died some years ago.

Mr. Forsyth left a fortune estimated at \$500,000, his unassuming modesty directing that a monument be erected over his grave, but not to exceed in cost \$2000. His will, as published, provides that after remembering a number of worthy charities with suitable bequests, the bulk of his fortune be left entirely to his nephew, James F. Foster, one of the firm of Sidney Shepard & Co., and also sole executor, for his use during life, when it is to be divided into two equal parts, each to constitute a separate fund, the income from which is to be used in artistically beautifying the Buffalo city park system and the purchase of art work for the Buffalo Fine Arts Academy.

Mr. Forsyth was a self made man, both as to fortune and education, having so improved his mental forces that he was thoroughly qualified to mingle in the best society. He had all the gentle instincts of the thorough

gentleman and availed himself of all opportunities to make up for any lack of early advantages, when he was compelled to maintain himself in the comparatively new western country.

He was a member of the Buffalo Club and belonged to the Trinity Episcopal Church. Mr. Forsyth's death will not interfere with the conduct of the firm's business, he having retired from active participation in it six years ago, since which time he has traveled and otherwise occupied his time in congenial ways.

KEUFFEL & ESSER COMPANY'S CATALOGUE.

KEUFFEL & ESSER COMPANY, 127 Fulton street, New York, with Chicago, St. Louis and San Francisco branches, in their fine new copyrighted catalogue show in exhaustive detail a diversified and comprehensive line of Drawing Materials, Surveying Instruments, &c., most of which they manufacture in their large factory at Hoboken, N. J., and some of which for trade reasons are imported. Only an inspection of the book, which contains 504 pages, each 9 x 5 1/4 inches, will give an idea of the great scope of the line represented. In this catalogue, which will be sent gratuitously to the trade, there are nearly 30 full page engravings from photographs distributed throughout the work, showing interior views of different departments in their factory and New York warehouse, together with exterior views, some of them in colors, of the factory as a whole, the New York headquarters and Western branches.

CHANTRELL TOOL COMPANY.

THE CHANTRELL TOOL COMPANY, Reading, Pa., have opened a New York branch with sample and warerooms at 103 Reade street, New York, for the better sale and distribution of their goods, in charge of F. E. Hutchins. This company, who are well-known makers of Hammers and Hatchets, Nail Pullers, Screw Drivers and other Hardware specialties, have recently begun the manufacture of Builders' and Shelf Hardware, for which they are well equipped. They have built a number of new additions to their plant, which has been fitted up with the latest machinery for producing a well assorted line of these goods of high quality and finish. The members of the company at Reading are old and experienced Hardwaremen, brought up with well-known manufacturers of this class of goods. Mr. Hutchins was for about 20 years with Hibbard, Spencer, Bartlett & Co., Chicago, and for the past two years has been connected with the Russell & Erwin Mfg. Company. A stock of goods will be carried in this city with which to execute orders promptly.

THE CAMERON & BARKLEY COMPANY'S CATALOGUE.

THE CAMERON & BARKLEY COMPANY, Charleston, S. C., have issued a catalogue of 638 pages, devoted to machinery and supplies and steam specialties. These, in a general way, cover goods for mills, mines, machinists, lumbermen, railroads, contractors, blacksmiths, quarries, engineers, foundries, &c. Illustrations are given in the front of the book of their store and warehouse, which are followed by an alphabetically arranged index. The catalogue is fully illustrated with list of prices conveniently arranged. In connection with their mill supply business the company have added a department of electrical construction and supplies. The company are to be congratulated on their enterprise in publishing such a catalogue, which will no doubt be highly appreciated by their patrons.

F. B. Leaper, Peshtigo, Wis., has disposed of his Hardware business to Duquaine Bros., Coleman, Wis., who have moved the stock to the latter point.

Ostrander & Cozine, Wells, Hamilton Co., N. Y., dealers in Hardware, Iron, Agricultural Implements, Stoves, Tinware, &c., are disposing of their stock with a view to discontinuing the business on April 1.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

Frier-Jacquín Hardware Company, Louisiana, Mo., advise us that they would be pleased to receive catalogues and quotations relating to General Hardware, Paints, Oils, Farming Implements and Machinery and Buggies.

Snyder Hardware Company, Louisa, Ky., have just opened in the wholesale Hardware business. The company have a capital stock of \$25,000, and are composed of experienced Hardwaremen. The new concern will appreciate copies of catalogues and price-lists from manufacturers of Hardware and related lines.

Martin Hardware Company have succeeded J. H. Martin & Co., wholesalers and retailers of English and American Hardware, St. Johns, Newfoundland. They express a desire for copies of catalogues relative to General Hardware, Sporting Goods, &c.

Gilbert Combs & Co., Freehold, N. J., dealers in Building Materials, Hardware, Lime, &c., are opening a branch establishment, and will be pleased to hear from manufacturers with copies of catalogues, price-lists, &c.

A new firm, under the style of Woodruff & Murphy, have purchased the long established General Hardware business of George Ohlheiser, 26 Genesee street, Auburn, N. Y., and will take possession on April 1. Mr. Murphy has been identified with the Hardware line for 22 years, and is at present chief clerk and buyer for the firm of Smith & Pearson. Mr. Woodruff is also connected with Smith & Pearson, and has been in their employ for a period of five years. The new firm will remodel the store and put in a plate glass front. They will value catalogues and price-lists from manufacturers of Hardware and kindred lines.

Robert G. Stone and William H. Stone have formed a partnership under the style of Stone Bros., and will embark in business in Jersey City, N. J., about May 1 as dealers in Hardware, Paints, Oils, Varnishes, Factory Supplies and House Furnishing Goods. The new firm request copies of catalogues, &c., which should be addressed to R. G. Stone, 13 Clark avenue, Jersey City.

Valley Hardware Company, Harrisonburg, Va., have incorporated under the laws of the State with a capital stock of \$25,000, \$15,000 being paid in. The company will do a wholesale and retail business in general Hardware, Stoves, Sash, Doors, Blinds, Glass, Paints, Oils, &c. The officers are: T. M. Rohr, president and manager; A. B. Driver, vice-president; L. A. Armentrout, secretary, and I. S. Ewing, treasurer. The company request catalogues and quotations from manufacturers and importers.

The Pieper Cutlery Mfg. Company, manufacturers of Cutlery and especially of the Pieper Razors, Hamilton, Ohio, are now ready for business and would be pleased to receive quotations on Razor Handles, Razor Boxes and Cutlery Handles. They refer to their Razor as one of the best on the market and use the Pieper process of treating and tempering steel, which, it is stated, has just been perfected after 20 years of study and experimental work.

W. B. Maccracken has disposed of his interest in the old firm of Maccracken & Winter Hardware Company, Lancaster, Ohio, and will buy a new stock and continue in the same line under the style of Maccracken Hardware & Implement Company, Mr. Maccracken's three sons will be associated with him in the new corporation. Copies of catalogues and price-lists will be valued by the new concern.

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National Retail Hardware Dealers' Association.

CONCLUDING REPORT.

IN accordance with a motion made by Mr. Ferres of New York a Committee of Arrangements, consisting of three delegates, one from Chicago, was appointed by President Cormick to act in conjunction with the local Reception Committee on the ways and means of visiting the various places of interest to which the association members had been invited. President Cormick named as members of this committee J. G. Ferres, New York; D. A. McLaughlin, Chicago, and L. H. Kurtz, Iowa.

President's Annual Report.

In presenting his annual report President Cormick congratulated the association upon the prosperous business year and the continued bright outlook. He spoke in general terms of his visits to the various State conventions, including those of Missouri, Indiana, Kentucky, Ohio, Pennsylvania and New York. He appealed to the national body to make arrangements for a national officer to visit the various State conventions, as the work had passed beyond the ability of the president and secretary, especially because of the conflicting dates which had been adopted by the various State associations. Continuing, he said:

As a result of the work during the past year I would call your attention to the following extract from the report of T. James Fernley, secretary-treasurer of the National Hardware Association, at New Orleans, November 19, 1902:

During the spring months it was our pleasure to visit upon invitation quite a number of the retail Hardware dealers' associations. We were convinced of three things. First, that these organizations were rapidly growing, not only in numbers, but in usefulness. Second, that they were being conducted by men of ability; men who were the peers of those found in the wholesale Hardware business. Third, and I assure you it was most gratifying, we found that these organized retailers were looking with great favor on the National Hardware Association.

With this evidence of kindly feeling and respect before us we can but conclude that at no distant date our officers will be invited to meet the officers of the National Hardware Association in conference. I trust you will authorize them so to do. Much more can be done by an understanding with this branch of the trade, though personally I prefer that the overtures should come from the other side.

President Cormick then gave the number of members in each State who were receiving the "National Bulletin." Continuing, he said: It is with pleasure we are able to call your attention to the addition since our last meeting of the associations of New York, Indian Territory, Nebraska and Colorado. With these we now have 17 States, and with the exception of one, possibly, all are full of enthusiasm and hope for increase in numbers and great results.

At your last session you instructed your officers to organize a mutual fire insurance company. You will remember the States were all for the idea, except one, and I have not as yet been able to find a valid reason why they should oppose. Then we began to consider the question. We found that the laws of the various States were so different that it would be necessary to employ expert legal talent to decide which was the best for our purpose. As no funds were at hand to apply to this use we were obliged to postpone action. However, in view of the able presentation of the matter last year, we are in hopes the matter will be considered by those who are competent and especially qualified for the task.

As the souvenir manual has met with unqualified success this year, I would recommend that it be made a permanent feature of the National Association, and individual States requested to discontinue theirs.

In order that enthusiasm be created in connection with the State work I would suggest that a meeting of

the various State secretaries be arranged before the convening of the State conventions, as in the past there was difficulty in arranging the dates for the various State conventions, and it appears advisable to devise means to control these dates in the interest of the National Association.

President Cormick then referred to the Parcels Post bill pending before Congress and urged that active efforts be made to defeat its passage. In conclusion President Cormick said:

In order that an interest may be kept up in the time intervening between these annual meetings of the different State associations, I would suggest that a special standing Committee upon Organization be appointed for the purpose of superintending the circularization of



W. P. BOGARDUS, President.

the trade on any topic that will interest them and induce them to join us.

In concluding this term of office I cannot but express to you my thanks for the uniform courtesy I have received from the officers and members of this association and call to your attention the efficient and effective work of your secretary and Executive Committee. They merit your approval.

While ties will be broken that have become dear, and responsibilities laid down cheerfully, yet I trust that the effect will be that as a body and as individuals we may

Live for something, have a purpose,
And that purpose keep in view;
Shifting like a helmless vessel,
Thou canst ne'er be true;
Half the wrecks that strew life's ocean,
If some star had been their guide,
Might have now been riding safely;
But they drifted with the tide.

Secretary's Annual Report.

Secretary Corey, in his annual report, gave an account to the convention of his visits to the various State associations, among them being Pennsylvania, Indian Territory, Minnesota and Nebraska. The Nebraska Association was organized during the summer of 1902, at Lincoln, and the first convention was held in February, the membership having increased to 206 in eight months.

The secretary also gave an account of his visit to Washington, D. C., where he had gone, by instruction of the National Association, to obtain information concerning the attitude of Congress regarding the Parcels Post bill.

Many complaints, he said, had been sent direct to the National secretary by merchants throughout the various affiliated States during the year. Nearly every State in the organization had been heard from respecting some grievance or other. Some of the cases had been referred back to the State secretaries and others investigated and reports made to the members directly interested.

Regarding the relations of the retail dealers with manufacturers he said: "During the year we have corresponded with many manufacturers concerning their contracting and selling their products through catalogue house channels, insisting that the prices quoted by such houses were the true test of their sincerity of desire to



C. H. MILLER, Vice-President.

protect the retail dealers. Some of the manufacturers are having their goods advertised at about cost in retaliation for attempted restrictions. The supreme courts have held that a contract in which the selling price is agreed upon is binding and can be enforced."

In closing he said: "The manual proposition opened a correspondence with many manufacturers as to our aims and objects, and we believe a clearer understanding resulted and some good was achieved thereby. In our correspondence we have endeavored at all times to be fair in our requests, conservative in our opinions and true to the best interests of our associated family.

"We have tried to give each State equal consideration and assistance. So far as we know there is harmony all along the line and a disposition to stand by the majority."

After reading the treasurer's report, which showed a balance of \$300 in the treasury, the convention adjourned until 9.30 a.m., Wednesday.

WEDNESDAY MORNING SESSION.

The convention reassembled at 10 a.m., upon call of the president, and further consideration was given to the recommendations made in the president's annual report.

The suggestion that the State associations discontinue the issuing of a manual was discussed at length and finally incorporated in a motion and adopted by a majority vote.

The matter of arranging dates for the annual meetings of the various State associations was referred to the State secretaries, who were to meet during recess and consider this, among other matters of common interest, and report to the convention. The discussion brought out the fact that the constitution and by-laws of some of the State associations have fixed dates for the annual meeting, and that therefore it would be difficult to make a change.

The recommendation made by the president concerning the payment of dues from State associations to the National Association was lost, but his recommendation against the Parcels Post bill was adopted.

The question of changing the date of the annual meeting of the National Association prior to the dates of meetings of the State associations was discussed at length and finally referred on motion to the Committee on Constitution and By-Laws. Subsequently that committee reported it, recommending that the National meeting take place before the State annual meetings, and the association concurred in the recommendation, but the matter was subsequently referred to the Executive Committee.

The recommendation made by the president that a standing committee be appointed to superintend the distribution of information to the members of the various State associations from time to time during the year was discussed at length. Some recommendations made in the secretary's report were also considered and passed upon, and it was the sense of the meeting that the influence of the association should be brought to bear upon manufacturers and the distributors of Hardware and the secretary's recommendation upon this subject was adopted.

The convention adjourned at noon to reassemble at 3.30 p.m., the interim to be devoted to dinner and an inspection of the new plant of Hibbard, Spencer, Bartlett & Co. of Chicago, now nearing completion.

WEDNESDAY AFTERNOON SESSION.

The association was called to order at 3.40 p.m., and the recommendation of the secretary in regard to the issuing of the National quarterly was approved, the receipts to be derived from the publication to be expended upon the journal.

The correspondence between the association and the National Association of Hardware Jobbers was read to the convention.

The recommendation contained in the president's report that a national retail Hardware dealers' insurance company be formed was discussed fully. Mr. Ladner of Minnesota gave the convention an outline of the experience which the Minnesota State Association had in forming an insurance company.

Upon motion, the president appointed Messrs. Burr of Ohio, Peck of Wisconsin and Taylor of New York as



M. L. COREY, Secretary.

a standing committee to distribute information and circulars to the members of the constituent State associations.

The convention then adjourned until Thursday morning.

Prior to adjournment, however, the members of the various committees, previously appointed, were notified that committee meetings would be held immediately after adjournment.

THURSDAY MORNING SESSION.

Upon the reassembling of the convention at 10 a. m. Thursday morning a letter from W. H. Bennett, chairman of the Entertainment Committee, was read inviting the association, on behalf of the American Steel & Wire Company, to visit the Steel and Wire plant of the United States Steel Corporation at Joliet. Upon motion the invitation was accepted.

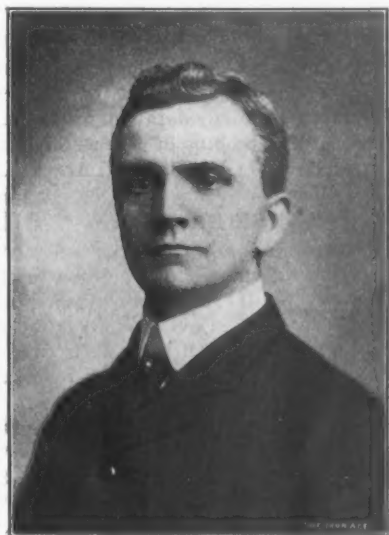
Reports from the various committees were then called for.

Report of Committee on Constitution and By-Laws.

W. H. Tomlinson, chairman of the Committee on Constitution and By-laws, recommended the following changes in the constitution:

That Article II, Section 3, read as follows:

Membership of the National Retail Hardware Dealers' Association shall consist of two delegates elected



SHARON E. JONES, Executive Committee.

by each State Association affiliated with the National Association having 100 members or less, and one additional vote for each additional 100 members or major fraction thereof.

That the following be added to Article II, Section 5, of the constitution:

The fiscal year of the National Retail Hardware Dealers' Association begins January 1.

That the following change be made in the by-laws. Article I be made to read:

The finances of the National Retail Hardware Dealers' Association shall be provided as follows: Each State association shall be assessed 75 cents per capita for each member of said association. The above amount, together with 25 cents for the Bulletin, as provided in Article II, shall be remitted for the current year by the State secretaries to the national secretary not later than March 15 for each member in good standing and whose dues are fully paid. The State secretary shall remit to the national secretary the full amount of national dues when any delinquent member pays his dues.

On motion the recommendations were adopted.

Report of Committee on Resolutions.

The Committee on Resolutions made the following report:

Whereas, The National Hardware Association, through their secretary, have signified their willingness to meet with our Executive Committee to consider matters of mutual interest; therefore, be it

Resolved, That our Executive Committee be instructed to meet with their Executive Committee, and that their secretary be notified.

Resolved, That the thanks of this association are hereby tendered to the Chicago Retail Hardware Association, and the manufacturers and jobbers for the magnificent banquet which they tendered and of which we had the pleasure of partaking; to Hibbard, Spencer, Bartlett & Co.; to the Grand Crossing Tack Company; the American Steel & Wire Company, and the Trout Hardware Company for privileges extended, and to the Briggs

House for the free use of rooms in which our meetings convened, and many other courtesies extended and conveniences provided.

Resolved, That our thanks be and are hereby tendered to the various trade journals and their efficient representatives for their loyal support and untiring efforts to promote our interests.

Resolved, That the sincere thanks of this association are hereby tendered to President Cormick, Vice-President Barnes, Secretary Corey, Treasurer Bogardus and the members of the Executive Committee for the able manner in which they have performed the duties of their respective offices at personal loss and inconvenience to themselves during the past year.

The resolutions were unanimously adopted.

Finance Committee Report.

The committee on finance and auditing reported that they had examined the books of the treasurer and found them correct.

Visit to Joliet.

At 11 a.m. a recess was taken until 3.30 p.m.

During the interval most of the delegates visited the plant of the American Steel & Wire Company at Joliet.

THURSDAY AFTERNOON SESSION.

At 5 p.m. the convention was called to order.

The consideration of the question of forming a fire insurance company was again taken up and discussed.

The discussion of the question was interrupted, however, by the report of the Committee on Nominations, the committee recommending the election of the following:

Officers for 1903.

PRESIDENT, W. P. Bogardus, Mt. Vernon, Ohio.

VICE-PRESIDENT, C. H. Miller, Pennsylvania.

EXECUTIVE COMMITTEE: H. G. Cormick, Centuria, Ill.; Sharon E. Jones, Richmond, Ind.; T. F. Ireland, Belding, Mich.; L. Lindenberg, Dubuque, Iowa; A. T. Stebbins, Rochester, Minn. All were unanimously elected.

Indianapolis in 1904.

The question of the next place of meeting was taken up. Chicago, Minneapolis and Indianapolis were placed



T. FRANK IRELAND, Executive Committee.

in nomination, and after spirited balloting Indianapolis was selected.

National Fire Insurance Company.

The discussion of the insurance question was resumed, resulting in Mr. Helgesen of North Dakota moving that the chair appoint a committee of three, with power to investigate and organize, under the approval of the Executive Committee, a National Retail Hardware Dealers' Mutual Fire Insurance Company.

The motion was adopted.

The president appointed the following committee: C. H. Miller of Pennsylvania; W. P. Lewis, New Albany, Ind., and C. F. Ladner, St. Cloud, Minn.

On motion the secretary was instructed to send to each State secretary a synopsis of the proceedings of the convention.

The secretary also was instructed to furnish badges bearing the name and State of each national delegate, to be worn at the next annual convention.

It was also determined that for the next annual convention a definite programme shall be outlined by the



L. LINDBENBERG, Executive Committee.

national association officials which shall be carried out to the letter.

The president then addressed the meeting, giving some excellent advice in regard to loyalty.

President-Elect Bogardus, upon taking the chair, made some appropriate remarks, expressing his appreciation. Remarks were also made by ex-President Lewis and Retiring-President Cormick, which were highly complimentary to the secretary and other officers who had served during the year. The sentiments expressed were unanimously indorsed through the association by a rising vote.

The last session of the convention was most enthusiastic, and the delegates were especially demonstrative, the various speakers being applauded to the echo.

National Hardware Association Notes.

H. S. Cleveland of Minneapolis read a paper, entitled "National Hardware Association Notes." Among other things Mr. Cleveland said:

We must convince retail dealers that we, in our association, are accomplishing something for their benefit to secure from them their hearty co-operation in our work. The ordinary retail Hardwareman has but little time, or thinks he has, to devote to any organization, unless he can see large returns for himself.

MAKE ADVANTAGES PROMINENT.

We need a greater education force brought to bear upon these men. We should keep an article continually in the trade papers, treating on some important subject in connection with work we are doing, and with carefully prepared articles in our National Bulletin we can lead these skeptics from darkness into light, and thereby gain a much larger membership. If we can show these men of little faith that they can make more money by joining our association than by staying out, they will most certainly join.

STIMULATE STATE ASSOCIATION GROWTH.

First, perfect and enlarge each State organization by systematic canvassing of each State, and the larger the representation we have in each State the better work we can hope to do in the national. The national

must show some specific work accomplished to be strong and effective with the individual. The individual dealer is the foundation of the State, and the State the foundation of the National Association.

AN APPEAL FOR BETTER ORGANIZATION.

If we expect to succeed, we must improve our organization, organize more perfectly our forces, wipe out all petty differences—local, State and national—develop better social relations, and better business relations will surely follow. We have already accomplished much, but we must accomplish more.

THE HARDWARE DEALER

as a man is a modest, unassuming, honest business man, respected in the community in which he lives, fair and just in his dealings, and deserves a better fate than to be strangled out of his business existence by the heel of monopoly. With the help of these associations may the light of prosperity ever shine across the pathway of the representative American Hardware dealer.

Upon the conclusion of the paper the convention adjourned *sine die*.

Meeting of the Executive Committee.

A meeting of the Executive Committee was held immediately after the adjournment of the convention. Besides attending to some detailed business, the committee elected A. T. Stebbins of Rochester, Minn., treasurer, and re-elected M. L. Corey of Argos, Ind., secretary.

THE BANQUET.

On Tuesday evening, March 17, the delegates attended a banquet at the Sherman House, given in their honor by the Chicago Retail Hardware Association, manufacturers, jobbers, *et al.* Covers were laid for 110 and there were but few absent guests. It was 7 o'clock when the company entered the dining room and almost 10 when coffee was served.

As the curling incense from the cigars rose in the fragrant air, H. H. Roberts of *The Iron Age* addressed the assembly, explaining to the company that owing to the absence of D. W. Simpson, president of the Wilcox Mfg. Company, Aurora, Ill., who was to have been toastmaster, he had been requested by the committee to occupy Mr. Simpson's place, saying:

"Those of you who have listened to Mr. Simpson know that it is impossible for me to do that. Under the circumstances, however, I will do the best I can."

"I notice by the *menu* that this is a banquet tendered to the delegates of the National Retail Hardware Dealers' Association. Now, the question naturally arises, What is the National Retail Hardware Dealers' Association? The association to-night is represented by 45 delegates, but back of those 45 delegates are, I am told, 4000 members; back of those 4000 members, I am informed, there is possibly capital invested of something over \$100,000,000. A delegate from the New York State Association makes the statement that he has tabulated the capital invested by Hardware merchants in that State, and finds it represents over \$50,000,000. Stop for a moment and consider to whom this banquet is tendered. It is tendered to 4000 members scattered all over this country.

"Now, we have with us this evening a number of these members to whom, I am sure, you will all be pleased to listen. They will tell you briefly of what they are doing for the manufacturers, for the jobbers and for themselves.

"In the meantime, before asking any of these delegates to address you, I will call on a gentleman who is a member of the Illinois Association, and who recently visited New Orleans in attendance at the convention of the National Hardware Association. I have a copy of a clipping from the New Orleans *Picayune* of November 18 of last year, which I would like to read to you."

The extract from the New Orleans paper was a delightful interview with W. H. Bennett of Chicago, in which Mr. Bennett was quoted as saying that he had been so charmed with the city of New Orleans that he had determined to transfer his business interest to the Crescent City:

"Since Mr. Bennett has transferred the scene of his activities to New Orleans," said the toastmaster, "he

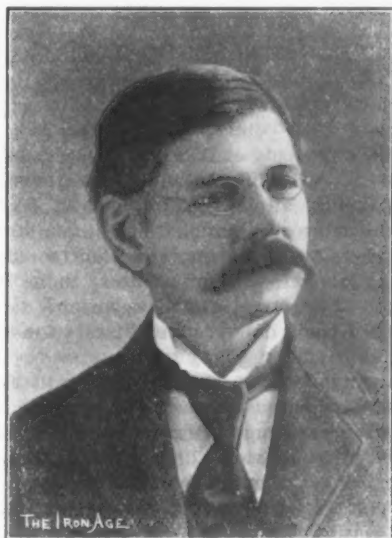
has been dubbed, by a large circle of friends, 'The Duke of Orleans.' It is now up to the Duke of Orleans to square himself."

Mr. Bennett, who as chairman of the Entertainment Committee and honorary member of the Illinois Retail Hardware Dealers' Association, occupied the place immediately to the left of the toastmaster, although completely taken by surprise, responded in a humorous vein which captured his hearers. He admitted that he had been to New Orleans, and did not deny the interview, but escaped the penalty of his disloyalty to Chicago by applicable anecdotes that turned the wrath of his Chicago *confrères*. As chairman of the Entertainment Committee he welcomed the delegates to the city, and congratulated the association members upon their choice of Chicago as the convention city.

Toastmaster Roberts then paid a very pleasant tribute to H. G. Cormick, ex-president of the National Association, who, on being introduced, spoke as follows:

Mr. Cormick's Remarks.

"Mr. Toastmaster and Gentlemen: The flattering language which has just been given in your hearing makes my heart palpitate. Everybody connected with



H. G. CORMICK, Executive Committee.

the Hardware Association has been giving me the glad hand. At the close of this convention the responsibilities will be laid aside by me. Many ties will be broken that will be bright memories the balance of my life. Occasions like these are few in our day. Many and bright are the memories that they bring to us. Joy and gladness sings in our hearts as memory carries us back to these times. It is certainly meet upon occasions like this, where goodfellowship, kindness and friendship are the august guests that surround these tables, that we should be glad and rejoice that men can come together in harmony and kindly feeling as this.

"The feeling which now exists between the retail Hardware dealers of this country and the two large kindred interests that minister to their wants is better than it has ever been before. Closer and closer are they coming together—touching heads and finding out the wants and desires of each; and I predict at no distant day many of the rough places that have made it hard for all of us will soon be smoothed down and pass into history."

The next speaker was Dennis McLaughlin, president of the Chicago Association, whose remarks were interesting and very much enjoyed.

Other speakers of the evening were S. S. Bryan of Titusville, Pa.; W. C. Stephens of P. & F. Corbin, Chicago; F. C. Moys, Boulder, Col.; Henry Taylor of the American Screw Company, Chicago; W. P. Lewis, New Albany, Ind.; C. H. Williams, Streator, Ill., and A. T. Stebbins, Rochester, Minn. The speakers punctuated

their remarks with interesting stories, which were apparently thoroughly appreciated by the assembled guests.

List of the Banqueters.

Among those present at the banquet were the following:

- | | |
|-----------------------------------|---------------------------------|
| H. G. Nish, Elgin, Ill. | John Dryden, Chicago. |
| F. C. Moys, Boulder, Col. | J. H. Bixler, Chicago. |
| S. R. Miles, Mason City, Iowa. | A. J. Stebbins, Chicago. |
| J. L. Smith, Chicago. | C. N. Barnes, Grand Forks. |
| H. T. Helgesen, Milton, N. D. | C. N. D. |
| F. F. Porter, Chicago. | C. A. Dalstrom, Chicago. |
| W. P. Lewis, New Albany, Ind. | A. T. Stebbins, Rochester. |
| M. L. Corey, Argos, Ind. | Minn. |
| H. G. Cormick, Centralia, Ill. | J. J. Sherlock, Chicago. |
| H. H. Roberts, Chicago. | F. A. Bare, Mansfield, Ohio. |
| W. H. Bennett, Chicago. | O. N. Hutchinson, Grand |
| D. A. McLaughlin, Chicago. | Crossing, Ill. |
| W. P. Bogardus, Mt. Vernon, | L. Fndelsen, Green Bay, Wis. |
| Ohio. | H. J. Racy, Chicago. |
| C. H. Williams, Streator, Ill. | H. A. Cole, Chicago. |
| J. R. Taylor, Little Falls, N. Y. | F. E. Sladden, Chicago. |
| W. T. Gormley, Chicago. | C. H. Conover, Chicago. |
| J. B. McAlister, So. McAlester, | D. A. Merriman, Chicago. |
| Ind. Ter. | C. A. Peterson, Oakland, Neb. |
| C. H. Miller, Huntingdon, Pa. | G. J. Adam, Chicago. |
| W. T. Partridge, Chicago. | J. G. Ferres, Johnstown, N. Y. |
| Z. T. Miller, Chicago. | C. W. Miller, Chicago. |
| W. R. Cutler, Chicago. | T. Frank Ireland, Belding, |
| W. H. Tomlinson, Le Sueur, | Mich. |
| Minn. | H. O. Spencer, Aurora, Ill. |
| F. L. Macomber, Chicago. | S. S. Bryan, Titusville, Pa. |
| O. P. Schlafer, Appleton, Wis. | C. H. Macbeth, Chicago. |
| Mr. Feddery, Chicago. | W. C. Stephens, Chicago. |
| C. F. Ladner, St. Cloud, Minn. | L. H. Kurtz, Des Moines, Iowa. |
| Alford P. Relfer, Chicago. | L. Schmetzer, Chicago. |
| C. A. Peck, Berlin, Wis. | H. O. McClure, Chicago. |
| F. N. Felix, Chicago. | H. S. Vincent, Fort Dodge, |
| M. S. Mathews, Minneapolis, | Iowa. |
| Minn. | P. Steward, Chicago. |
| L. E. A. Clark, Chicago. | H. E. Rebman, Chicago. |
| H. F. Rabe, Cleveland, Ohio. | F. H. Warren, Chicago. |
| R. R. Leeds, Chicago. | A. J. Scott, Marine City, Mich. |
| G. R. Lott, Chicago. | W. A. Sickles, Chicago. |
| Geo. M. Dunham, Chicago. | W. E. Jakway, Kearney, Neb. |
| W. G. Barker, Chicago. | N. B. Nicol, Grand Crossing, |
| J. B. McKeown, Chicago. | Ill. |
| I. Macquarrie, Chicago. | Paul Wagner, Louisville, Ky. |
| S. E. Jones, Richmond, Ind. | O. Lockett, Jr., Chicago. |
| W. E. Noebeling, Chicago. | E. M. Bush, Evansville, Ind. |
| E. W. Hutchinson, Grand | R. L. Morley, Chicago. |
| Crossing, Ill. | J. D. Warren, Chicago. |
| J. F. Doty, West Liberty, Iowa. | P. R. Burr, Piqua, Ohio. |
| A. A. Norton, Chicago. | W. H. Taylor, Chicago. |
| H. C. Smith, Chicago. | F. Neudorff, St. Joseph, Mo. |
| H. E. Gnadt, Chicago. | F. Fee, Chicago. |
| J. R. Sower, Frankfort, Ky. | L. Goldsmith, Chicago. |
| A. W. Sprague, Chicago. | G. W. Trout, Chicago. |
| L. Lindenberg, Dubuque, Iowa. | W. J. Krueger, Chicago. |
| J. V. Kloeber, Chicago. | Evan Nelson, Chicago. |
| J. C. Frederick, Owensboro, | J. Seither, Keokuk, Iowa. |
| Ky. | C. H. Milversted, Chicago. |
| A. J. Bliss, Chicago. | Frank Warren, Jr., Chicago. |
| Appleton Clark, Chicago. | O. V. Stebbins, Chicago. |
| G. Peppier, Chicago. | S. P. Johnston, Chicago. |

Excursion to Works of American Steel & Wire Company.

On Thursday morning the convention held a short session, adjourning at 10.30 o'clock, and shortly after nearly all the delegates left for a visit to the works of the American Steel & Wire Company at Joliet, Ill. The company had a special car attached to the Chicago & Alton Limited, which left Chicago at 11.25, reaching Joliet one hour later. Under the direction of Superintendent Lutz of the Scott street works of the American Steel & Wire Company the party were conducted to the Hobbs Restaurant, where covers were laid for 50 guests. After enjoying a bountiful dinner the party visited the plants of the American Steel & Wire Company and the Illinois Steel Company. The visit was a most interesting one to all, many of the delegates never before having had the opportunity of seeing the manufacture of Wire Nails, Plain and Barb Wire, &c. The heads of the several departments accompanied the guests, so that every detail of manufacture, from the Billet to the finished material, was thoroughly explained. At 3 o'clock the party repaired to their car, which had been switched into the works, and were quickly attached to the 3.15 train, reaching Chicago at 4.15. The American Steel & Wire Company had stocked the car bountifully with cigars and liquid refreshments, and under the efficient management of D. A. Merriman, assistant general sales agent of the company, everything necessary for the comfort and enjoyment of the guests was arranged.

Shortly after leaving Joliet the delegates passed a vote of thanks to the American Steel & Wire Company for the courtesies extended. Mr. Merriman replied, and on behalf of the company expressed his regret that the business of the convention had not allowed the delegates to spend more time at his company's works, but thanked them for their visit, and invited them to come again, either as a convention or individually, and his

company would at all times be glad to show them through the works. The following is a list of the excursionists:

C. W. Lutz, Joliet, Ill.; L. Lindenberg, Dubuque, Iowa; M. S. Mathews, Minneapolis; F. F. Porter, Chicago; H. S. Cleveland, Minneapolis; H. S. Vincent, Fort Dodge, Iowa; W. T. Gormley, Chicago; S. R. Miles, Mason City, Iowa; H. G. Cormick, Centralia, Ill.; W. P. Bogardus, Mt. Vernon, Ohio; C. A. Peck, Berlin, Wis.; O. F. Stebbins, Rochester, Minn.; E. M. Bush, Evansville, Ind.; J. S. Fulton, Portland, Ind.; D. R. Burr, Piqua, Ohio; H. N. Joy, Hamilton, N. D.; H. F. Rahe, Cleveland, Ohio; J. B. McAlister, South McAlester, Ind. Ter.; C. A. Peterson, Oakland, Neb.; S. E. Jones, Richmond, Ind.; C. F. Ladner, St. Cloud, Minn.; F. C. Moys, Boulder, Col.; W. H. Tomlinson, Le Sueur, Minn.; W. P. Lewis, New Albany, Ind.; S. S. Bryan, Titusville, Pa.; W. G. Krueger, Chicago; Chas. Williams, Streator, Ill.; H. G. Nish, Elgin, Ill.; C. N. Barnes, Grand Forks, N. D.; H. T. Helgesen, Milton, N. D.; J. G. Ferres, Johnstown, N. Y.; Z. T. Miller, Chicago; J. R. Sower, Frankfort, Ky.; C. W. Miller, Chicago; T. F. Ireland, Belding, Mich.; W. E. Jakway, Kearney, Neb.; W. H. Bennett,



W. H. BENNETT, Chairman Entertainment Committee.

Chicago; J. C. Frederick, Owensboro, Ky.; S. P. Johnston, Chicago; D. A. Merriman, Chicago; A. W. Sprague, Chicago; H. H. Roberts, Chicago.

Hibbard, Spencer, Bartlett & Co.'s New Home.

On Wednesday afternoon the delegates spent several profitable hours inspecting the new plant of Hibbard, Spencer, Bartlett & Co., on State street and the Chicago River. They were welcomed at the State street entrance by W. G. Hibbard, where the doors were opened for the first time in honor of the delegates, and they were conducted through the fire proof building by C. H. Conover and five or six others of the company's force, who had been delegated for that service. After the inspection of the new building the delegates were taken on one of the company's lighters to the extensive warehouse of the firm near the harbor. Probably the most conspicuous feature of the warehouse is the excellent facilities for both receiving and discharging freight, a railroad track extending the full length of the building on the east and a depressed wagon way on the west, while the building fronting on the Chicago River gives all the facilities necessary for transportation by water. Before returning the company were taken on the lighter into the inner harbor, and then back through the river to the new building, which will be ready for occupancy probably on April 1. Nearly all the delegates in attendance at the convention were present, as well as a number of local representatives of manufacturers and of the press.

CONVENTION NOTES.

The Allith Mfg. Company of Chicago were the only manufacturers of Hardware specialties that had an exhibit at the convention. The well-known models of the Reliable Door Hanger attracted a number of delegates and secured to President H. C. Smith and Representative F. E. Sladden a satisfactory volume of business.

The National Heat Regulating Company of Milwaukee were represented by O. Kornreich, manager of the company, who took pleasure in showing the models of Furnace Regulators, Dampers and Fittings to the delegates interested in the improved system of regulating heat and controlling warm air furnaces.

Frederick H. Warren, Chicago, representing the Michigan Stove Company, was very popular among the delegates. The black pocketbook souvenir which he distributed was fully appreciated. Within each book was the following greeting crowned by the Garland trademark in embossed gold: *Wishing you the compliments of the season, with the hope that your purse may always be heavy and your heart always light.*

NORVELL-SHAPLEIGH HARDWARE COMPANY'S BLUE BOOK.

THE NORVELL-SHAPLEIGH HARDWARE COMPANY, St. Louis, Mo., have just issued their Hardware blue book, which is a volume of 1700 pages, each 9½ x 12 inches, cloth bound. The title pages contain an excellent steel engraving of A. F. Shapleigh, who founded the business in 1843, and of their new eight-story main building covering an entire city block, fronting on Washington avenue and bounded on the remaining sides by Third street, Lucas avenue and Fourth street. Another full page engraving illustrates their five-story warehouse on Main street and Cass avenue, to which a double railroad track delivers freight cars for the direct receipt and shipment of heavy goods.

The company have recently moved into their new building on Washington avenue, where they have every convenience for handling a large business promptly and economically. The various departments are carefully organized under experienced managers, and the increasing importance of mail orders is fully recognized and provided for. The catalogue is divided into departments as follows: A, Mechanics' Tools; B, Builders' Hardware; C, Farming Tools and Agricultural Goods; D, Harness and Saddlery; E, House Furnishing, Wooden Ware, Paints and Miscellaneous Hardware; F, Tinware, Enameled and Japanned Ware, Tinnners' Tools and Roofing Material; G, Cutlery, Silver Plated Ware, Clocks and Watches; H, Guns, Sporting Goods and Fishing Tackle, and J, Bicycles, Sundries, Automobile Supplies and Sewing Machines. Handsome colored insert pages fronting sections A, C, G and J give an excellent idea in *fac-simile* of the labels used on their private brands of goods, as Diamond Edge, Blue Diamond, Black Prince, Bridge Tool Company, Mound City, Success, Live Oak, Rugby, Nonpareil and Shapleigh Special.

Particular care has been taken to make the catalogue as concise as possible, using small cuts and a number of them on a page, except in goods where it is necessary the cut should represent the article actual size, for example, Tacks, Screws, Bright Wire Goods, &c. The catalogue is bound in blue cloth, the standard color of all stationery used by the company. Their salesmen and employees will refer to it as "The Hardware Blue Book," and the company express the hope that, as the city "Blue Book" is supposed to contain the names of its best residents, so "The Hardware Blue Book" will contain the very best and latest goods in the Hardware line. The volume is certainly an imposing one and illustrates the enterprise of the company and their prominent position in the trade.

Dothan Hardware Company, Dothan, Ala., who have formerly done a wholesale and retail business in Hardware, Mill Supplies and Building Material, have decided to do a wholesale trade exclusively hereafter.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, }
NORFOLK STREET, LONDON, W. C. }

The Week's Hardware Trade.

THE Electro Plate trade is at the present moment being badly hurt by the improvement in the sale of Sterling Silver Goods. Larger numbers of people are buying sterling articles, which they regard as cheaper in the long run than Plated Goods, and as also possessing a certain intrinsic value. This is especially the case in Spoons and Forks and other articles of domestic use. In Sheffield manufacturers are expressing the hope that under the corporation the School of Art will become more and more a nursery of designs for the Sheffield trades of all kinds, particularly of metals, stone and other materials. In connection with the improvement of the trade in Sterling Silver Goods it is worth remembering that the world's output of Silver has not in recent years shown any marked expansion. This may come as a surprise to many American readers. In 1900 the output was 173,000,000 ounces; 1901, 175,000,000 ounces, and 1902, 179,000,000 ounces. Of this quantity the United States supplied in 1900 58,000,000 ounces; 1901, 55,000,000 ounces; 1902, 58,500,000 ounces. The Mexican output was practically the same as that of the United States. Australia supplied about 13,000,000 ounces each year, and the remainder came from Spain, Russia and South America. At the present time quotations for Silver are stiffening.

South African Directories

I have received from Donaldson & Hill, the well-known South African publishers of Cape Town and Durban, whose London address is 2 McLean's Buildings, New Street Square, E. C., four directories which cover the whole of South Africa. Two of these directories are devoted to Cape Colony, one to the Eastern and one to the Western Province. A third is for Natal and a fourth is for the Transvaal and Rhodesia. The fifth, covering the Orange River Colony, is not quite ready. The publishers will be able to deliver by the end of March. Full and complete particulars are given of every town throughout South Africa, so that it is quite easy to get in touch by correspondence with all the buyers throughout the immense district covered by these directories. In the larger towns the trades are divided and this is a convenience. Most of the towns in South Africa are, in point of population, quite small, and the probability is that the "general dealer" trades in practically everything. If, therefore, any circularizing is to be done it is well to remember that in most cases the general dealer is the retailer of all sorts of goods in any given district. In addition to the names of the traders in South Africa and for useful official information the publishers present their readers with a whole series of maps, not only of large areas, but maps or plans of the chief towns. Thus, if some particular street in Cape Town is mentioned, by referring to the map of Cape Town it will be possible to see whether it is near the center of the trading community or otherwise.

Cape Colony Metal and Hardware Imports.

Particulars are now to hand of the imports of Cape Colony for 11 months of last year, the particulars of which are appended, indicating a doubling of business in these lines:

	11 months ended November 30, 1901.	11 months ended November 30, 1902.
Metals and metal manufactures (includes Iron, Lead, Machinery and Hardware).....	£1,557,000	£2,888,000
Wood and manufactures of (includes Furniture and Cabinet ware).....	733,000	1,260,000
Carriages and other wheeled vehicles.....	165,000	389,000
Pipes, Iron and Earthen.....	110,000	162,000
Oil, Mineral.....	113,000	150,000
Agricultural Implements.....	68,000	133,000
Earthenware and Crockery.....	84,000	123,000

Commercial Travelers' Licenses in the Transvaal.

A few weeks ago I announced for the benefit of those about to travel in South Africa where and how to obtain passes to travel in the Transvaal and the Orange

River colony. Up to recently commercial travelers have not only had to obtain a traveling pass, but also be in possession of a license. This license has now been repealed, according to an ordinance published in the Transvaal Government Gazette for January 9.

American Trade in India.

More than one comment has been made upon the failure of American exporters to plant their feet firmly in two markets, both of which are open to them. The first is India and the second South America. In both cases the United States buy from these countries more than they sell. Thus, the imports into the United States from South America have grown from \$90,000,000 in 1890 to \$120,000,000 in 1892, while the exports to South America from the United States in 1890 were \$38,500,000, and in 1902 there was an actual shrinkage to \$38,000,000. From India and Ceylon the imports into the United States in 1890 were about \$20,000,000; 1902, \$50,000,000, while the exports from the United States to the British East Indies were, in 1890, \$4,650,000, and in 1902 a slight shrinkage to \$4,600,000 occurred. In this connection I would draw the attention of any readers of *The Iron Age* who have not yet seen it to an official paper recently issued by the Washington Bureau of Statistics, which gives a number of interesting facts relating to India. In this paper I read that second in order in value of India's imports are manufactures of iron and steel, which form about 12 per cent. of the total imports, while next in order is Mineral Oil, which forms about 5 per cent. of the total imports. If in addition we remember that 36 per cent. of India's imports are cotton goods, it thus becomes clear that more than half of the total of Indian imports is composed of the class of articles for which the United States has special facilities of production, and in which she is undoubtedly among the world's largest producers. There are, no doubt, serious difficulties confronting American exporters who would open up a connection with India. The financial situation in India is very slightly easing, the effects of the drought and of famine are slowly being minimized or mitigated, and there is no preferential tariff. In these circumstances, and remembering that before many months have elapsed American manufacturers will once more be looking to develop their export trade, I think that it would be money well spent to build up a connection with India.

Puzzled and Angry.

A Sheffield firm have written a letter to *Commercial Intelligence*, a brightly written weekly journal published in London, which indicates both puzzlement and anger. The letter is as follows:

Dear Sir: A little while ago you took a very wise lead in pointing out to the public the misleading statements with regard to the export development of American manufactures. May we call your attention to another point in this expansion which seems to be overlooked.

American File manufacturers are doing an "export business," but on what lines?

Here is an example:

Half round Bastard Files, 6 inches long, are sold inside their own country to large consumers at 70 per cent. discount off a price-list adopted by the File manufacturers of the United States, dated November 1, 1899.

This list gives the price of these Files at \$6.10 per dozen, so that their price to meet the home buyer is practically 7 shillings 6 pence per dozen net, and these same manufacturers, to do an "an export business," sell these same Files here at the Sheffield standard list price, which is 7 shillings per dozen, and from this they quote 70 per cent. discount.

Is this selling goods or is it giving them away? Could not any nation do an export trade on such lines as these?

The editorial comment upon this letter is quite delightful. It points out that "export trade on such lines is of the gravest disservice to the countries which practice it. To sell more cheaply to the foreigner than to the home consumer is a disgrace to the exporter." I, of course, cannot tell how far the statements in the above letter are true. But assuming that American Files are being sold under cost, two comments may be made. In the first place, that a British commercial paper should give prominence to the fact that American File manufacturers are selling their Files under cost, I cannot un-

derstand. Clearly, the buyers of Files will not be slow to take advantage of the position. My second comment is, however, that if this were the case, sooner or later American exporters would have to advance prices. The moment they did this there would come the usual cry that no sooner is a substantial trade secured than prices are advanced. This leads to irritation and loss of trade. It would be agreeable to many over here to hear authoritatively from American File manufacturers that the statements contained in the letter to *Commercial Intelligence* are untrue, both in substance and in fact.

American Nails and Wire.

Some time ago I announced the probability of an advance in the prices of Nails and Wire, and it is now stated over here that New York makers intend to advance their export quotations on the ground that the severity of European competition is now relaxed. The chief trouble during the past year or two has been caused by the Austrian factories, who were selling at unremunerative rates, especially in Asiatic markets, to cut out the German makers. They have now had as much of this as they want, and prices in consequence are hardening. German Screw makers are very full of work, one firm in particular stating that they cannot contemplate fresh contracts until summer at the earliest. The stiffening of prices has been aided by the strike in Northern Europe, and by the immediate strong demand from South Africa. In all such goods prices are expected to remain strong until next autumn.

A Building Exhibition in Paris.

Plans have now been matured to hold a building exhibition at the Grand Palais in Paris. It will be open to all nations, and the statement is made that Great Britain, Belgium and Germany are particularly active in taking out space. American manufacturers of Builders' Ironmongery should certainly come into the Exposition du Batiment.

The Prospects in China.

Large orders are at the present time being executed in this country on China account, both in soft goods and in metal manufactures. I mention both these departments of industry advisedly, because they are both, in their several ways, of great value as an indication of the state of trade in China. In the north of England there are factories whose output is fully covered by Chinese orders until midsummer, and long cablegrams are being received day by day in London offices, both from Hong Kong and North China ports. Much of this is doubtless speculative, but it may be taken as a clear indication that British commercial agents on the spot believe that the immediate future of the Chinese trade is assured. The glut of imports, which was a feature of the market reports issued from Shanghai and Hong Kong within the last twelve months, has been moderated by the gradual absorption of stocks which were not replenished at the time, and some actual scarcity may be experienced in certain articles before the new shipments reach their destination. A collateral inference from the present situation is that, in the view of the Anglo-Chinese community, the fall in Silver is now steadying itself, because no prudent house would undertake large commitments if there were any serious prospect of a smart loss upon the exchange values.

A Note on Aluminum.

I hear that a serious attempt is to be made to introduce Aluminum into the normal equipment of the Indian army. Hitherto the authorities have hesitated at the cost, but it is now being recognized that a reduction of a pound in the weight carried by the infantry of the line is always worth money, and nowhere more than in the tropics. During the new financial year, therefore, certain regiments which have hitherto carried water bottles made of various heavier metals—enameled or galvanized iron and copper—are to be furnished with Aluminum bottles, and the principle may be extended to the Basins and Cups which make up the commissariat utensils of the military unit. If this should prove to be the case, it is not improbable that a considerable stimulus will be given to the Aluminum industry, both raw material and finished product.

A Note on Platinum.

Mention of Aluminum reminds me of the Russian Platinum industry, which appears to be seriously handicapped because there is no refinery for dealing with this metal as it exists in the country. Russia produces nearly 95 per cent. of the world's Platinum; but whereas she sells the raw metal at 13,000 roubles (51½ cents) per pood, she has to buy it back refined at 25,000 roubles per pood (a pood is equivalent to 36 pounds avoirdupois). Yet the process of refinery costs only about 300 roubles. The question, after having been for many years under the consideration of the Government, is now to be solved. A state subsidy is to be granted to a syndicate, which intends to establish a refinery, in order to make the Siberian Platinum industry entirely independent of foreign influences.

Trade-Marks in India.

In view of the increasing trade done by America with India, it is important to remember that there is no adequate system of trade-mark registration in that country. The Cutlers' Company of Sheffield have been taking the matter in hand and have recently submitted a memorandum to the Secretary of State for India. A vexed question is opened up in this connection, for it would appear that the interests of Hardware and metal manufacturers are in this instance not identical with those of the makers or exporters of soft goods. The question was first mooted so far back as 1877, when the Chamber of Commerce and Millowners' Association at Bombay asked the Government of India to establish a system of trade-mark registration. In the year 1879 a bill was introduced, based on the English acts then in force. Those responsible for that bill were prepared to insert in it certain concessions in favor of the holders of marks registered in England. While the bill was in the committee stage it was found that difficulty was likely to arise with the holders of registered English marks, and especially with the holders of cotton marks, who would be practically compelled to register afresh in India. Ultimately the Bombay merchants changed their minds and declared the bill was not needed. As things are now, if a civil remedy is sought by way of damages or injunction the Indian courts are guided by the common law, and it would be a question of fact to be decided in each case whether use in, say, America has created an exclusive right in any particular Indian market.

South African Trade: A Warning.

For some months past now the shipment of goods to South Africa has gone on merrily, but during the past two or three weeks there has been a distinct slackening in orders. In addition, not a few British firms are a little anxious as to credits. Orders have not been scrutinized so carefully as they ought to have been, and there is now considerable doubt as to the solvency of a number of South African commercial speculators. One result to be expected from the condition of things in South Africa is the growth of a certain ephemeral class of trader with little or no capital, and who for the time being flourishes like a green bay tree at the expense of his better established competitors. The end may be delayed for a shorter or longer period, but it is always the same—insolvency. This evil has not as yet had time to develop to any serious degree in South Africa, but a note of warning is perhaps worth while. Unless there is to be a very serious commercial reaction in South Africa, it is important that all responsible exporters should know to whom they are sending their goods, and should have a clear understanding as to length of credit and discounts. I understand, of course, that it is not always easy even for an honest and solvent trader to pay to date. The effective demand for goods is considerably greater than the monetary capacity of the consumer, and allowance for this must, of course, be made. While it is important to scrutinize orders and to keep a sharp eye on anything in the nature of reckless trading, it is still more important to keep a sharp eye on the character of those South African traders with whom we are brought into commercial contact. It is worth knowing, however, that at the present time in Cape Town and elsewhere a number of commercial adventurers are having their fling.

The South African Import Trade.

The imports into Cape Colony for the year 1902 reached £34,190,500, as against £23,992,031 in 1901. The exports reached £17,436,131, compared with £10,873,273. On the import side, the transit trade was: Transvaal £4,811,220, compared with £1,162,162 the previous year, and Rhodesia £674,275, compared with £842,963 in 1901. These figures are by cable. I have, however, received details of the South African import trade for the first ten months of last year. Items of interest to readers of *The Iron Age* are as follows:

Imports into Cape Colony.

	Ten months ended October 31, 1901.	Ten months ended October 31, 1902.
Metals and metal manufactures (includes Iron, Lead, Machinery and Hardware).....	£1,374,000	£2,448,000
Wood and manufactures of (includes Furniture and Cabinet ware).....	638,000	1,057,000
Pipes, Iron and Earthen.....	98,000	150,000
Oil, Mineral.....	97,000	135,000
Agricultural Implements.....	58,000	115,000
Earthen Ware and Crockery.....	75,000	105,000
Paints and Colors.....	57,000	86,000

Transvaal Imports.

	11 months ended November 30, 1901.	11 months ended November 30, 1902.
Metals and manufactures (includes Agricultural Implements, Bicycles, Hardware, Iron and Steel manufactures, Cutlery, Machinery, &c.).....	£222,000	£2,292,000
Wood and manufactures (includes Furniture).....	31,000	558,000
Toys and Sporting Goods.....	7,000	44,000

Imports into Orange River Colony.

	Quarter ended September 30, 1901.	Quarter ended September 30, 1902.
Hardware, Brass and Copper ware, &c.	£6,000	£19,000
Wood, raw and manufactured (includes Furniture).....	2,000	18,000
Iron, galvanized and corrugated.....	.....	5,000
Vehicles: Bicycles and accessories....	1,000	2,000
Other kinds of Vehicles.....	1,000	3,000
Oils of all kinds.....	1,000	2,000

Kano.

Among the numerous little wars that Great Britain is at the present moment waging (one result of our imperialism is that we seldom have less than six wars going on at the same time) is one in the district of Kano, in the Soudan. It is necessary to remember that the term Soudan is given to the whole territory lying immediately south of the Sahara. It is bounded on the north by the Sahara, on the east by the Abyssinian Highlands, on the south by the lands draining to the Congo basin, and on the west by Senegambia. It covers an area of 2,000,000 square miles, and has a population of 90,000,000. Kano is in the western and central division of the Soudan. It is at once a city and a province. With the province I am not much concerned, but the town of Kano is evidently an interesting place, to judge by some remarks upon it in an interesting book I have just been reading, "Affairs in West Africa," by Edmund D. Morel. Regarding Kano, he says:

If the trading instinct of the Hausas (the people of Kano) are remarkably developed, their industrial enterprise is still more so. It may with safety be declared that the product of their looms and dye pits constitutes the most extensive articles in the internal commerce of the Dark Continent. Kano is the head and center of this intrinsically native industry, which is unparalleled in Africa, and Kano is, and in all human probability will continue to be, Manchester's great rival for the African interior markets. The number of Europeans who have visited Kano may still be counted upon the fingers of both hands. . . . Kano's resident population has been variously estimated. . . . For hours, another traveler has said, you may wander about Kano noting industrial scenes like the above, seeing how civilization has increased the wants of the people and produced a necessary division of labor into weavers, dyers, blacksmiths, brass workers, saddle makers, tailors, builders, horse boys, agricultural laborers, domestic servants, shoemakers, shopkeepers, traders and others.

Another writer, Charles Henry Robinson, in his book on Nigeria, tells us that

Kano may claim to possess the largest market place, not merely in Africa, but in the world. The French traveler, Colonel Monteil, estimated its average daily attendance at 30,000; and though I should not have ventured on quite so large a one myself, I do not think that his estimate is very extravagant. Size, moreover, is the least interesting feature of the Kano market. In the first place, its antiquity is deserving of notice. The market has probably been held on the exact site where we now find it for at least 1000 years. At the time of the Norman conquest of England trade was being conducted in the Kano market amid surroundings closely resembling those that we now see. Kano would then have furnished better made cloth than any to be found in England at that time. The really unique interest, however, attaching to this market arises from the fact that it forms the center of a native civilization which has been attained with very little aid from outside sources, and with none at all from Europe. It is the meeting place of representatives of almost every tribe of any respectable size to be found in Africa north of the equator.

In this huge market there are, of course, so to speak, stalls of various departments, and large purchases are made by Kano native buyers of raw material, which is worked up by the native talent. Now that this market is being opened up by force of arms, American exporters would do well to bear it in mind, for I suspect they have in their catalogues a number of articles which might be sold in this region, which possesses such palpably potential commercial prospect.

THE AMERICAN TIN PLATE COMPANY.

STATISTICS show that during the last three or four years, or since the American Tin Plate Company began to reform the methods of producing Terne Plates, the efforts of that company to re-establish the old time reputation of Roofing Tin are meeting with great success. The use of Terne Plates, especially of the higher grades, is said to have increased to a very great extent during the last few years, and this material is now again becoming to a great extent preferred to other kinds of Roofing Material. When the American Tin Plate Company came into possession of all the larger Tin Plate works in the country they also gained the services of the best experts in this branch of industry. The combined experience and knowledge of the latter, as well of the experts engaged by the United States Steel Corporation, of which the American Tin Plate Company are a constituent concern, are at the disposal of the Tin Plate Company. This fact, strict supervision and the systematic mill practice which prevails in all the company's works, enable them to produce a superior quality of material. The most favored brands at present are the MF Old Style and the U. S. Eagle N. M., but besides these the company make a variety of other grades to suit various purposes and occasions. Recently the company issued a handsome little booklet entitled "A Fifty Year Roof," which, besides giving a sufficient history and description of Tin and Terne Plate making, also teems with useful technical information. Copies may be obtained from W. C. Cronmeyer, 1211 Carnegie Building, Pittsburgh, Pa., the Pittsburgh agent of the American Tin Plate Company.

THE GLEN MFG. COMPANY.

AT a meeting of the stockholders of the Glen Mfg. Company of Ellwood City, Pa., makers of Steel and Wire specialties, held last week, it was decided to increase the capital stock of the concern from \$12,500 to \$25,000. No change was made among officials, who are as follows: H. P. Richardson, president; George S. Seaman, vice-president; A. M. Jones, secretary and treasurer, and F. H. Stedman, general sales agent. This concern are meeting with a very large demand for their products, and while their plant has been in operation for only a few months, it has been found necessary to considerably increase their capacity.

J. P. Tyler & Co. have lately engaged in the Hardware, Stove, Tinware, Agricultural Implement and Sporting Goods business in Ladora, Iowa.

THE TRAVELING SALESMAN HIS METHODS AND CONTROL

BY SAMUEL MASTERS.

CHAPTER XI. Covering Unoccupied Territory.

IT is not often the case that in an occupied territory new routes can be made up to be covered to as good advantage as the jobber would like. The men first on the ground have selected the towns they found most profitable, and the ones that are left lie between and about the better towns in such a way that the man on the new route is not allowed to stop at some very desirable places he passes through and must confine his energies to the second best towns with their lesser amount of trade, and travel further than he should to reach them. The jobber feels that this distribution of territory is all wrong, and his maps and dealers' lists confirm him in this belief. He may see that one route that brings him \$50,000 of business in a year saps a territory that should afford him three \$30,000 routes. Indeed such a condition is too common.

What Can He Do?

In the first place, he can insist that the man upon the ground show his right to his territory by covering it thoroughly. If there are outlying towns which he desires to have released he can so exert his influence to induce the salesman to cover more thoroughly a limited territory as to make the more distant towns seem less desirable. If he can prove that it is to the salesman's advantage to visit vacant towns lying within the confines of the territory that logically belongs to his route the salesman will soon cease to care for the towns which it costs him more to make. He can make it understood that one account of \$2000 or \$3000 a year in a city of 10,000 inhabitants does not warrant the salesman in neglecting to call upon the other dealers there. He can insist that the smaller towns be taken up and worked regularly, where the conditions are favorable for trade, and keep steadily before the salesman the alternative of having another man put upon the uncovered towns if he himself does not care for them. In this way much can often be done.

Partly Covered Towns.

He will also find that in occupied towns through which the salesman must pass the present incumbent cannot sell all of the firms. Under such conditions, there is no reason why both men should not stop there. In fact, there are instances where three men from the same house have had paying trade in a junction town without interfering with each other, and the man who originally had the town drew just as much business from it as when he alone stopped there.

In this system the firm and not the town is the unit. Every firm's purchases are a matter of interest to the jobber, and unless definite cause can be given why he should not share in them, his not doing so is a loss to him. If a salesman has tried to sell a nonpurchaser and failed, and is satisfied that his attempts in this direction are useless, there is nothing to do but to submit unless the territory is so arranged that a second salesman can visit the same town, and his doing so will not offend the present customer.

The New Route

So in laying out a new route the jobber can put upon it the vacant towns lying in the same section, and can add to the list the good dealers not called upon in towns already covered, and which he has previously ascertained cannot be sold by the men then out. There will need to be at the beginning from 40 to 50 of these smaller towns upon such a route, for in some instances a salesman can cover two or three of them in a day by driving or using the trolley lines, and a man should not be in any way hampered by lack of territory when the greater number of his customers are in the smaller towns and do not buy large quantities.

Such a route almost invariably grows better and yields more business the longer it is traveled. The salesman naturally does all in his power to increase his business. Opportunities for adding towns and firms will

arise as other salesmen drop them. Instances are not infrequent where a salesman on an old route will voluntarily relinquish good towns and accounts in order to pay more attention to other trade and will even sacrifice something to help out a brother salesman. In two instances in the writer's experience, when this system was introduced, each of the old salesmen brought forward a friend and offered to make room for him in his territory, fairly dividing the towns with him and making good, well arranged routes, though prior to the adoption of a definite plan they had resented any intimation that the ground was not fully occupied.

Distance a Prime Factor with Small Towns.

The distance from the home or shipping point has an important bearing upon the value of small towns, for, as a rule, the small country dealers prefer to buy in the nearest large center, and thus secure the quickest delivery of small lots. In one instance a country dealer who failed applied to a jobber for a position on the road, and selected for his route a number of small towns in nearby territory, all of which he had learned from the jobber's salesmen were not covered. He was given permission to see what he could do, and to the jobber's surprise pulled \$30,000 of business out of the territory the first year. This was a driving route, more than half of the distance being traveled behind horses, visiting country cross roads stores. Driving routes are particularly profitable in good dairy sections not too near a large city, as in some sections of Ohio, New York and Pennsylvania; in localities such as the coal mining district on the Kanawha, and the tan bark region of Pennsylvania where the development of a local industry has increased the buying capacity of the district in advance of the railroads and settled towns, and in sections like the northern portion of New York State, where people dwell in small communities at a distance from the large centers.

THE AMERICAN COAL PRODUCTS COMPANY.

THE AMERICAN COAL PRODUCTS COMPANY is the name of a concern recently organized to construct and operate coke ovens, deal in Coal, Coke, Tar, Ammonia and similar commodities; also to manufacture merchandise composed of these products. The company are also authorized to own the shares of corporations engaged in any of the above named enterprises. The corporation have an authorized capital of \$15,000,000, the par value of each share being \$100, and there is but one kind of stock.

The company have purchased a majority of the shares of the United Coke & Gas Company, who are engaged in the construction and operation of coke ovens. They have also acquired a majority of the shares of the Barrett Mfg. Company, who are engaged in the Coal Tar and Ammonia business, such as the manufacturing of Roofing Felts, Pitch, Paints, &c., and other Roofing and Building Papers and materials. The American Coal Products Company also have a standing offer to purchase further shares of both the companies named above, if offered on or before May 1, 1903.

The sale of the United Coke and Gas Company and of the Barrett Mfg. Company shares was arranged by direct conference with the leading interests in each company, and up to the present the American Coal Products Company have purchased about 90 per cent. of the total outstanding shares of the United Coke & Gas Company and about 80 per cent. of the total outstanding shares of the Barrett Mfg. Company.

IOWA HARDWARE INSURANCE COMPANY

IN accordance with the action taken at the last annual convention of the Iowa Retail Hardware Dealers' Association to organize a State mutual fire insurance company the following Executive Committee has been appointed: S. R. Miles, Mason City; L. Lindenberg, Dubuque, and C. E. Haas, Le Mars. The necessary legal steps have been taken and the committee expect to be prepared to write policies within 60 days.

PRICE-LISTS, CIRCULARS, &c.

THE ENTERPRISE MFG. COMPANY OF PENNSYLVANIA, Philadelphia, Pa.: Illustrated catalogue, superseding all previous issues, under date of February, 1903. This is devoted to Polishing Irons, Meat and Food Choppers, Grinding and Pulverizing Mills, Measuring Faucets, Beef Shavers, Fruit, Wine and Jelly Presses, &c.

THE DAWSON HARDWARE COMPANY, LIMITED, Dawson, N. T.: "Miners' Price-List," Vol. 1. This contains much matter of local interest, in addition to illustrations and prices of Tools, Agricultural Implements, Firearms, Stoves and Ranges, Granite, White Enamel and Tin Ware, Shelf and Heavy Hardware.

THE KELLEY-HOW-THOMPSON COMPANY, Duluth, Minn.: Catalogue of 57 pages, illustrating season goods. This is the forerunner of the company's large catalogue of about 1500 pages, to be issued next fall. The present book is being sent to many dealers in Wisconsin, Michigan, Minnesota and the Dakotas.

THE CINCINNATI FLY SCREEN COMPANY, 1252-1254 Richmond street, Cincinnati, Ohio: Herkes Improved Sliding Window Screen, Screen Doors, Combination Ceiling Wire Guard and Screen, &c.

THE CLARK BROS. BOLT COMPANY, Milldale, Conn.: Catalogue and price-lists devoted to Carriage, Machine, Plow and Special Bolts, Coach Screws, Nuts, Rivets, Washers, &c.

THE MASSACHUSETTS SAW WORKS, Springfield, Mass.: Pamphlet illustrating Hack Saws and Hack Saw Blades, Band Saws, Butcher Saw Blades, Butcher Saw Punches, Kitchen Saws and Circular Saw Machines.

THE CANTON FILLET COMPANY, Canton, Ohio: Pamphlet devoted to illustrations and list prices of the Belding Leather Fillet.

THE MARBLE SAFETY AXE COMPANY, Gladstone, Mich.: Catalogue illustrating Safety Pocket Axes, Safety Pocket Hunting, Canoe, Yacht, Skinning and Fish Knives, Automatic Gaff Hooks, Compass and Bracket, Water Proof Match Boxes, Rear Sights, Shell Extractors, Cleaning Rods, &c.

THE DELPHOS CAN COMPANY, Delphos, Ohio: Illustrated catalogue relating to Pump, Spout and Faucet Oil Cans, Long Handled Dust Pans and Rotary Corn Poppers.

EDWARD S. HOTCHKISS, Bridgeport, Conn.: Illustrated catalogue of Horse and Toilet Clippers. He also manufactures Metallic Mouse Traps, Self Setting Steel Rat Killers and S Wrenches.

THE WHITAKER MFG. COMPANY, Chicago, issue a 1903 illustrated catalogue and price-list containing 145 pages of Hardware and Agricultural Specialties, Factory and Railway Supplies. There are full sized drawings of all the prominent smooth and serrated sections and guard plates with position of rivet holes, of special value to customers in ordering when the name of the machine is unknown. Under Cutting Apparatus are arranged Mower and Reaper Smooth Knives and Reaper Sickles, with a full list of the various machines which the Knives and Sickles will fit, being interchangeable with those furnished by the original manufacturers. The same system is carried out with regard to Mower and Reaper Smooth Sections and Reaper Sickle Sections, the size and price of each section being placed opposite the name of the machine, and each section is provided with a number and telegraphic code word to facilitate ordering. Under the head of Pitman Boxes and Pitman Bolts is a long list of the machines of various makes to which they are applicable, each size and make being designated by a letter and number. In addition are illustrated Binder Covers and Mowing Machine Oilers with straight or bent spouts, Link Chain Belting and various Agricultural and Hardware Specialties manufactured by the company. Quite a number of Tools and Supplies, Fittings and Trimmings are also shown.

THE BAKER MFG. COMPANY, Evansville, Wis.: Pumps and Cylinders. An illustrated catalogue and price-list is devoted to these goods, showing Wind Mill, Force, Set Length and Pitcher Spout Pumps, Tank Heaters, Pipe Stocks and Dies, other Pipe Tools, &c.

THE SAVAGE ARMS COMPANY, Utica, N. Y.: Illustrated catalogue and price-list devoted to high grade hammerless Military Sporting Rifles and Carbines, Metallic Ammunition, Reloading Tools, Sights, &c.

WM. AYRES & SONS, Philadelphia, Pa.: "5/A Monthly Magazine," devoted to their business as manufacturers of 5/A Horse Blankets.

THE UTILITY MFG. COMPANY, Baltimore, Md.: Catalogue entitled "Leaks," illustrating Biscuit Cutters, Sifters, Strainers, Match Scratchers, Scoops, Knobs, &c.

THE AKRON CULTIVATOR COMPANY, Akron, Ohio: Tubular Steel Barrows and Patent Balanced Charging Barrows. The Wheelbarrows are referred to in an illustrated catalogue as being superior to ordinary cheap pressed tray Barrows. The Charging Barrows are designed for use by gas works, furnaces and railroads, and are alluded to as easy running, well balanced and easy to handle. The company also issue a catalogue devoted to Kraus Pivot Axle Cultivators.

A. TREDWAY & SONS HARDWARE COMPANY, Dubuque, Iowa: Spring circular No. 32 illustrating spring and summer goods, Pocket Cutlery, Paints, &c.

THE D. L. BATES & BRO. COMPANY, Dayton, Ohio: Electric Fans, including Ceiling, Column, Desk and Bracket Fans; also Rheostats. An illustrated catalogue describes these goods.

THE SAWYER TOOL MFG. COMPANY, Fitchburg, Mass.: Catalogue F, illustrating Steel Rules, Gauges, Straight Edges, Protractors, Combination Squares, Trammels, Micrometers, Machinists' Hammers, Screw Drivers and Bits, Punches, Nail Sets, Valve Wheels, &c.

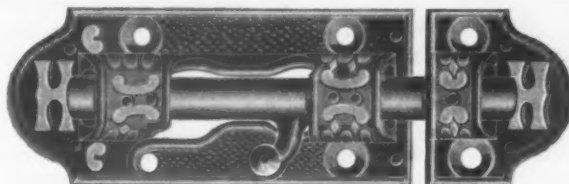
MISCELLANEOUS NOTE.

Robin Hood Powder and Shells.

The Robin Hood Powder Company, Swanton, Vt., are manufacturing a smokeless powder which, while containing no nitro-glycerine or gun cotton, develops, it is remarked, a high velocity with a low breech pressure, owing to the burning qualities of the powder, and at the same time avoids the liability to users of the dangers incident to the use of nitro powders. As the powder ignites freely it can be used with satisfactory results in a shell with a common primer, it is explained, as it does not necessitate an extra strong primer or reinforced shell and special wadding. It is also a bulk powder, loading bulk for bulk with black powder which overcomes the danger of double charges, which frequently occur with hand loaders using dense powder. There is also the saving of the cost of extra wads where it is impossible to secure high base shells. Another advantage claimed is the light recoil which is appreciated by sportsmen, together with an even pattern and great penetration. The company are making a full line of shotgun shells in both long and short brass, and they expect soon to place on the market a complete line of ammunition. The goods are attractively put up, making them desirable shelf goods for the dealer, as well as being in a convenient form to meet the demands of the trade.

Cast Iron Figured Barrel Bolt.

The Hoffman Hinge & Foundry Company, Cleveland, Ohio, are putting on the market the door bolt shown in the accompanying cut. It is referred to as combining strength, beauty and cheapness. It is pointed out that



Cast Iron Figured Barrel Bolt.

the bolt is twice as strong as the old style bolt, where over half of the metal is drilled away for a hole to permit riveting on a brass knob.

Sliding Door Sets and Lock.

The Perfect Sliding Door Company, Bridgeport, Conn.; M. D. Halpin, 62 Reade street, New York representative, have brought out the Perfect sliding door hanger and Schuyler lock here illustrated. Fig. 1 shows the hanger, with ball bearings and a section of the track on which it travels. The hanger and rail are made of smooth cold rolled steel, the wheel consisting of two metal disks riveted together, operating on high grade hardened steel balls, which cause the door to glide so easily, it is explained, that a slight touch of the hand serves to operate it. The rail end is supported by cantilever gauge brackets to insure perfect alignment. The hangers and rail are each provided with liberal adjust-

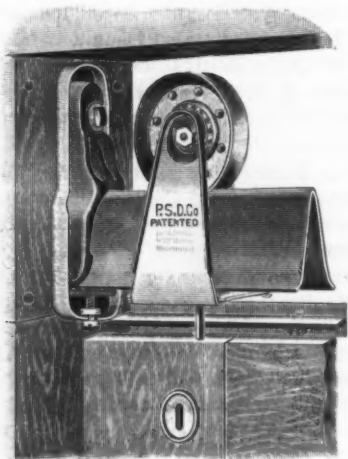


Fig. 1.—Perfect Sliding Door Hanger, Sectional View.

ments, which can be made at any time without removing casings, jambs or stops. Adjustable roller guides hidden behind the stops guide the door without checking its even movement. There is a buffer provided which noiselessly cushions the back stroke of the door and can be used to close it when desired. Front guides prevent rattling of the door, and center the door in the stops when closing. Fig. 2 represents the Schuyler lock which has been perfected for single and double sliding doors. It latches the door when closed, whether locked or unlocked, and has a small key which can

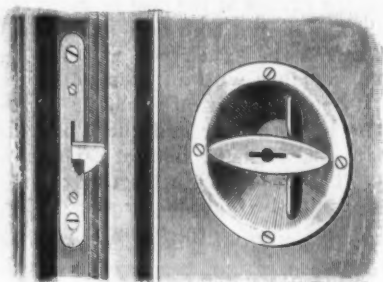


Fig. 2.—Schuyler Sliding Door Lock.

readily be carried on the person. This lock used in connection with their damper cord prevents noise and shuts out cold drafts. The cord is a new device which they make expressly for sliding doors, and is used by tacking it to the jamb between the stops, close into one corner. With each of the single locks a supply of the cord is furnished. The novel features of the hangers, rail and lock are that they are made almost solely of cold rolled sheet steel, they can be used between very narrow jambs, thus economizing room, and the adjustments can be made without cutting wood work or even removing any part of the lock. In connection with the goods described above, the company also manufacture structures for the sliding doors to work in for both single and double studded walls, to be introduced com-

plete in new or old work, which will be furnished according to specifications shown in the company's trade literature.

The Elkhart Automatic Heat Regulator.

The accompanying cuts relate to an automatic heat regulator offered by the Elkhart Automatic Heat Regulator Company, Elkhart, Ind. In Fig. 1 is shown the thermostat, which is placed in a room, while Fig. 2 illus-

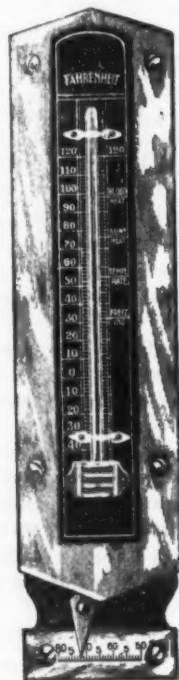


Fig. 1.—The Thermostat.

trates the motor, which is controlled by the thermostat, which in turn opens and closes the dampers of the heater, to which it is connected by wires and pulleys. The motor is operated by storage batteries equipped with dry cells, which are designed to last a long time by the exercise of care, and which can be renewed at a very low cost in a few minutes. The motor is devoid of springs, clock mechanism, vapor, water or compressed air. The thermostat is a mechanical thermometer with a graded scale attached at the lower end, by which any desired temperature within its range can be attained. The action of the regulator is automatic and its movement starts the motor, which operates the heater dampers. It is stated that the motor will operate on a hot water or warm air furnace, and that it will control low pressure steam with satisfaction. The ease with which

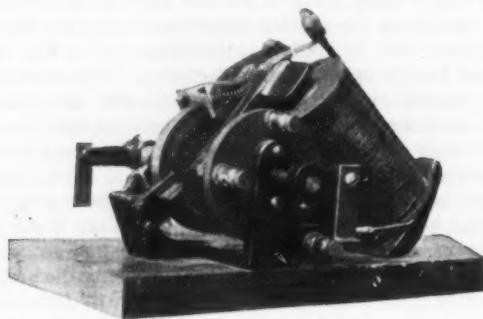
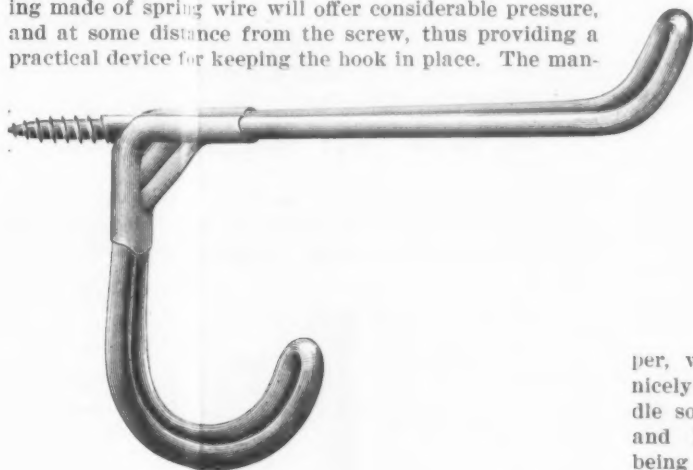


Fig. 2.—The Motor.

the regulator can be installed is pointed out, the makers claiming that a tinner, hardware or furnace man of intelligence can readily make the attachment to the heater, so that it is unnecessary to employ an electrician. The manufacturers claim that the device will not only regulate the temperature with mathematical accuracy, but that it will save 25 per cent. of fuel.

The Bradley Metal Clasp Coat and Hat Hook.

The Atlas Mfg. Company, New Haven, Conn., are introducing the coat and hat hook shown herewith. The special feature is the metal clasp which is placed in the angle of the hook where, it is remarked, the support is most needed. Room is gained by the use of this device, it is pointed out, also the hook has a symmetry and finish, the loose end of the wire being covered, not ordinarily secured in a cheap hook. The lower hook has a slight fullness at the back which, it is explained, will strike the wood first as the hook is screwed in, and being made of spring wire will offer considerable pressure, and at some distance from the screw, thus providing a practical device for keeping the hook in place. The man-



The Bradley Metal Clasp Coat and Hat Hook.

ufacturers refer to the fact that there is much less tendency to scratch the wood than if the hook first struck the wood near the screw, or if it was rigid, offering no chance to spring.

The Lancaster Tobacco Clipper.

The Lancaster tobacco clipper illustrated herewith is a new design of clipper for cutting stems of tobacco

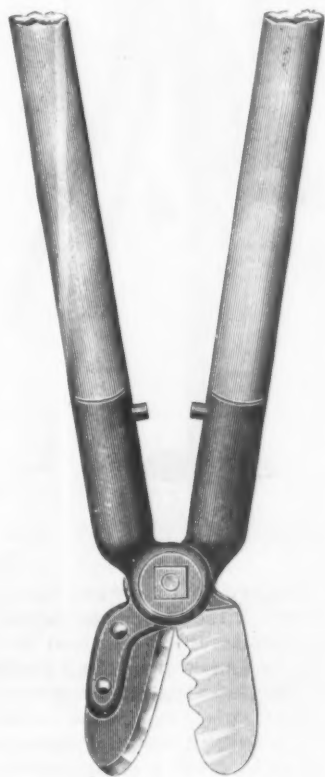


Fig. 1.—The Lancaster Tobacco Clipper.

plants in the field. An important feature of the clipper is the joint, which is made circular, of 2 inches in diameter, and wearing on a double pivot, giving it a largely

increased wearing surface. This joint is covered with a cap washer, which not only protects the joint from sand and dirt, thereby lessening wear, but also serves the purpose of a cup to retain oil, to insure perfect lubrication and longer and easier operation. The castings are all of malleable iron. The blades are made of crucible steel, oil tempered and fully warranted, and made either in a single or double style. The blades are set at an angle of 45 degrees to the handles of the clip-

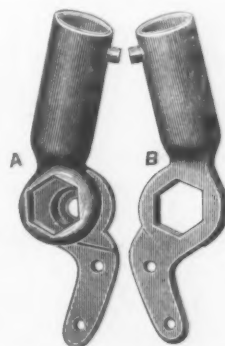


Fig. 2.—Detail of Tobacco Clipper Joint.

per, which are made of well seasoned, selected ash, nicely polished and driven into the slightly tapered handle sockets. The clipper is referred to as being light and having great strength and durability. It is being manufactured and placed on the market by the Lancaster Tobacco Clipper Company, Lancaster, Pa.

The Brighton Vegetable Press.

The accompanying cut is of a vegetable press being put on the market by the Logan & Strobbridge Iron Company, New Brighton, Pa. The pressure pail is made of heavy tin plate, with a tinned wire gauze bottom. All parts of the press coming in contact with the vegetables are coated with pure tin; other parts are japanned. The press is designed for restaurant and hotel use in mashing



The Brighton Vegetable Press.

potatoes and other vegetables. Potatoes boiled in their skins, it is explained, and put through the press come out in slender shreds, leaving their skins behind. If desired, the pressure pail can be placed in a pot and the potatoes boiled in it; when lifted out the water will at once drain off through the screen bottom. The pail is then put in the press, and in two minutes the mashing is done. In this way the potatoes are not touched after being put in to boil. The press is now made only in the size illustrated, but by May 1 the company expect to have a 4-quart size ready for market.

Cluster Incandescent Gas Burners

The Cosmopolitan Light Company, 41-45 State street, Chicago, Ill., have put on the market the new two and



Fig. 1.—Two-Light Incandescent Gas Burner.

three light cluster gas burners here shown, which are referred to as unique in incandescent gas lighting. Fig.



Fig. 2.—Three-Light Burner, Same Principle.

1 illustrates the No. 8 two-light burner, which is made of polished brass, with gas regulators contained in a 4-

inch basket, and capable of furnishing over 200 candle power. Fig. 2 represents the No. 9 three-light burner and otherwise similar, with a capacity of over 300 candle power, we are advised. The burners can be screwed onto any gas jet and can be used with their new stem pilot by-pass, made especially for these lights. The burners are furnished with a 9-inch glass chimney, and the service is said to cost less than half that of the arc lamps now in use. Incandescent mantles are used in connection with the burners. These and many other lamp goods of this character are shown in a catalogue, which will be sent to the trade. It will be remembered this company some months ago absorbed the Chicago Solar Light Company of Kenosha, Wis., when they were reorganized with a capital of \$1,000,000 and new officers.

The Baker Valve Spout Force Pump.

The accompanying cut represents a new valve spout force pump, adjustable stroke, recently placed on the market by the Baker Mfg. Company, Evansville, Wis.



The Baker Valve Spout Force Pump.

The pump is designed so that when the piston bar is down the hand end of the handle stands very high, close to a vertical position. It is explained that wind mill strokes are usually longer than hand strokes, and this design permits the accidental connection of the handle to the pump piston, while the piston is connected to a running wind mill without resulting damage, also when pumping by hand it gives a comparatively short and easy stroke. The brace is of angle steel, and by reference to the cut it will be seen that it is always directed under the fulcrum. The pump is provided with either a plain siphon spout or valve siphon spout. The valve spout is arranged to positively stop either the pipe or spout opening, but not both at the same time.

Cartridges—

Blank Cartridges:	
32 C. F., \$5.50.....	10¢55
32 C. F., \$7.00.....	10¢55
22 cal. Rim., \$1.50.....	10¢55
32 cal. Rim., \$2.75.....	10¢55
B. B. Caps, Con. Lall Supt.....	\$1.90
B. B. Caps, \$2.75.....	\$1.40
Central Fire.....	25¢
Target and Sporting Rifle.....	1¢50
Primed Shells and Bullets.....	15¢10
Rim Fire Sporting.....	50¢
Rim Fire, Military.....	15¢50

Casters—

Bed.....	70¢70¢10¢
Plate.....	60¢60¢55¢
Philadelphia.....	75¢75¢10¢
Boss.....	100¢100¢
Boss Anti-Friction.....	70¢100¢
Martin's Patent (Phoenix).....	45¢
Standard Ball Bearing.....	15¢
Tucker's Patent low list.....	30¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Coil—

American Coil, Jobbers' Shipments:	
3-16 1/2 5-16 3/4 7-16 1/2 9-16	
8-16 1/2 1-2 1-16 3/4 1-8 3/4 1-4	
3-8 3-16 3-8 3-16 3-8 3-16 3-8	
3-8 3-16 3-8 3-16 3-8 3-16 3-8	
German Coil.....	60¢10¢10¢

Halters and Ties—

Halter Chains.....	60¢10¢10¢10¢
German Halter Chains, list July 25.....	60¢10¢10¢10¢
Cone Ties.....	60¢10¢10¢10¢

Trace, Wagon, &c.—

Traces, Western, Standard: 100 pair	
1/4-6-3, straight, with ring.....	\$30.00
1/4-6-3, straight, with ring.....	\$1.00
1/4-6-3, straight, with ring.....	\$35.00
1/4-6-3, straight, with ring.....	\$35.00
1/4-6-3, straight, with ring.....	\$35.00

Trace, Wagon and Fancy Chains—

Trace, Wagon and Fancy Chains.....	50¢10¢10¢10¢
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Miscellaneous—

Jack Chain, list July 10, '93.....	60¢10¢10¢10¢
Brass.....	60¢10¢10¢10¢
Safety Chain.....	70¢10¢10¢10¢
Gal. Pump Chain.....	10¢10¢10¢10¢
Covert Mfg. Co.....	40¢25¢

Covert Mfg. Co.—

Breast.....	40¢25¢
Halter.....	40¢25¢
Rein.....	40¢25¢
Stallion.....	40¢25¢

Covert Mfg. Co.—

Covert Mfg. Co.....	40¢25¢
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Covert Mfg. Co.....	40¢25¢
Covert Mfg. Co.....	40¢25¢

Little Giant Auxiliary Drill.....	40¢
Little Giant Double Grip Drill.....	40¢
Little Giant Drill, improved.....	40¢
One da Drill.....	40¢
Scroll Combination Lathe.....	40¢

Clamps—

Adjustable, Hammer's.....	20¢20¢50¢
Carriage Makers'.....	50¢100¢
Carriage Makers' Sargent's.....	60¢
Best, Parallel.....	35¢100¢
Linemans, Ulica Dr. o Forge & Tool Co.....	40¢
Saw Clamps, see Vices, Saw Files.....	

Cleaners, Drain—

Iwan's Champion, Adjustable.....	55¢
Iwan's Champion, Stationary.....	40¢

Sidewalk—

Star Socket, All Steel.....	50¢
Star Shank, All Steel.....	50¢
W. & C. Shank, All Steel.....	50¢
\$3.05; 8 in., \$3.10; 8 1/2 in., \$3.25.....	

Cleavers, Butchers—

New Haven Edge Tool Co.....	45¢
Fayette H. Plumb.....	35¢
P. S. & W.....	50¢50¢50¢
L. & J. White.....	30¢

Clippers—

Chicago Flexible Shaft Company	
93 Chicago Horse.....	\$8.75
1002 Chicago Horse.....	\$10.75
Lighting Belt.....	\$15.00
Chicago Belt.....	\$20.00
Stewart's Patent Sheep.....	\$18.50

Clips Axle—

Eagle and Superior 1/4 and 5-16	
inch.....	70¢10¢
Norway, 1/4 and 5-16 inch.....	70¢10¢

Cloth and Netting, Wire—

See Wire, &c.

Cocks, Brass—

Hardware List:

Compression and Plain Bibbs.....

Globe, Kerosene, Racking, &c.....

Cocks.....

Coffee Mills—See Mills, Coffee.**Collars Dog—**

Brass, Walter B. Stevens & Son's list, 40¢

Embossed, Gilt, Walter B. Stevens & Son's list, 40¢

Leather, Walter B. Stevens & Son's list, 40¢

Combs, Mane and Tail—

Covert's Saddlery Works.....

Compasses Dividers, &c.—

Ordinary Goods.....

Bemis & Cail Hdq. & To A Co.....

Calipers, Call's Patent Inside.....

Calipers, Double.....

Calipers, Inside or Outside.....

Calipers, Wing.....

Compasses.....

J. Stevens & A. T. Co.....

Compressors Corn Shock—

J. B. Hughes' P. doz.....

Conductor Pipe, Galva.—

L. C. L. to Dealers:

Territory.....

Eastern.....

Central.....

Southern.....

S. Western.....

Terms, 25 for cash. With delivery on full order.

See also Eave Troughs.

Coolers, Water—

Gal, each.....

Labrador \$1.20 \$1.50 \$1.80 \$2.10 2.70

Gal.....

Iceland, ea. \$1.80 \$2.10 \$2.40 \$3.00

Gal.....

Galv. Lined Ea. \$1.85 \$2.20 \$2.25 \$2.50 \$3.00

Galv. Lined side handles.....

Gal.....

Each.....

Coopers' Tools—

See Tools, Coopers.

Cord Sash—

Braided, White, Com.....

Cable Laid Italian.....

Common India.....

Cotton Sash Cord, Twisted.....

Patent Russia.....

Cable Laid Russian.....

India Hemp, Braided.....

India Hemp, Twisted.....

Patent India, Twisted.....

Anniston Cordage Co.....

Old Glory, Nos. 7 to 12.....

Anniston, Nos. 7 to 12.....

Old Colony, Nos. 7 to 12.....

Anniston, Nos. 7 to 12.....

Pearl Braided, cotton.....

Massachusetts, White.....

Massachusetts, Drab.....

Eddystone Braided Cotton.....

Harmony Cable Laid Italian.....

Ossawa Mills.....

Crown, Solid Braided White.....

Braided, Grand, White.....

Peerless.....

D. M. Steward Mfg. Co.	
Metal Workers' Crayons, gr. \$2.50	
Soapstone Pencils, round, flat	
or square.....	gr. \$1.50
Hollowing Crayons.....	gr. \$2.50
Railroad Crayons (composition) gr. \$2.00	

See also Chalk.**Crooks, Shepherds—**

Fort Madison, Heavy.....	50¢
Fort Madison, Light.....	50¢

Crow Bars—See Bars, Crow.**Cultivators—**

Victor Garden.....	50¢
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Cutlery Table—

International Silver Company:

No. 12 Medium Knives, 18 in., per doz. \$3.50

Star, Eagle, Rogers & Hamilton and

Anchor.....

Wm. Rogers & Son.....

Simoon L. & Geo. H. Rogers Company:

12 dwt. Medium Knives.....

Sterling, \$5.00 each.....

Cutters—Glass—

H. B. Mayhew Co.....

Red Devil.....

Smith & Hemenway Co.....

Woodward.....

Meat and Food—

Hale's, Nos. 11 & 111 13 & 113

Per doz.....

American.....

Each.....

Enterprise.....

Nos.....

Each.....

Dixon's.....

Nos.....

Home No. 1.....

Little Giant.....

Nos.....

N. E. Food Chopper.....

Sterling.....

No. 1.....

New Triumph No. 605.....

Woodruff's.....

Nos.....

Enterprise Beef Shavers—

Henry Disston & Sons:

Slaw, Con. Grater, &c.....

Kraut Cutters 24 x 7, 26 x 8, 30 x 9, 55¢

Kraut Cutters 30 x 12, 40 x 12.....

Sterling.....

Tucker & Dorsey Mfg. Co.:

Kraut Cutters.....

Slaw Cutters, 1 Knife, 1 gr.....

Slaw Cutters, 2 Knife, 1 gr.....

Tobacco—

All Iron, Cheap.....

Enterprise.....

National.....

Sargent's.....

Sargent's.....

Washer—

Appleton's.....

Bonney's.....

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger.....

Iwan's Improved Post Hole Auger.....

Iwan's Vaughan Pattern Post Hole

Augers.....

Iwan's Perfection Post Hole Digger.....

Iwan's Split Handle Post Hole Diggers.....

Kohler's.....

Kohler's Little Giant.....

Kohler's Hercules.....

Kohler's Invincible.....

Kohler's Rival.....

Kohler's Pioneer.....

Never Break Post Hole Digger.....

\$24.00.....

Samson.....

Dividers—See Compasses.**Doors Screen—**

Phillips', style E, 1/4 in.....

Phillips', style D, 1/4 in.....

Phillips', style X, 1/4 in.....

Porter's Plain, No. 6.....

Porter's Ornamental, No. 70.....

Porter's No. 99.....

Porter's No. 44.....

Drawers Money—

Tucker's Pat. Alarm Till No. 1.....

\$15. No. 2, \$15. No. 3, \$12. No. 4, \$18.

Drawin Knives—

See Knives, Drawing.

Drills and Drill Stocks—

Common Blacksmiths' Drill.....

Smith & Hemenway Co.....

Stanley's R. & L. Co.'s.....

No. 64, Varied Handies.....

No. 86.....

Swan's.....

